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ABSTRACT

This study documents the differences in school quality-related measures between high-expenditure and low-expenditure school districts, examines the effects of different per-pupil expenditure levels on school quality-related measures, and uses an administrative model to assess the flow of expenditure level into school quality-related measures. The model used by the authors is Mort's Sequential Simplex Model. Data for the statistical analyses were collected for each of New York's 705 school districts for the 1975-76 school year. Based on their analysis, the authors conclude the following: 1) the district power equalizing system or any other school finance system that increases the expenditure-level gap among school districts creates significant differences in school quality-related measures; 2) as expenditure levels rise, so do per-pupil expenditures for instructional services; 3) as per-pupil expenditures increase, professional salaries rise faster than staff/pupil ratios; and 4) the Sequential Simplex Model is a useful approach for studying the effects of the flow of expenditures into school quality-related variables. (JG)

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THE SEQUENTIAL SIMPLEX MODEL THEORY - AN APPROACH FOR STUDYING THE DISEQUALIZING EFFECTS OF EXPENDITURE LEVELS UPON SCHOOL QUALITY RELATED VARIABLES

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CHAPTER 1

RESEARCH FINDINGS AND CONCLUSIONS -- A SUMMARY

INTRODUCTION

Typically, research findings and conclusions are presented at the end of a research report. We have departed from this tradition for several reasons.

First, many school administrators, legislators, and other persons interested in school finance research are primarily interested in the research findings and the conclusions reached. The research methods and procedures they leave to the researchers for comment and analysis.

Second, in this research study, we have endeavored to present more than just the research methodology, the findings, and our conclusions. To this end, we developed in rather great detail the fiscal setting for public school expenditures. School expenditures just don't happen. Trends in expenditures for public education are the resultant of a number of complex determiners. We indicated a number of these in Chapter 2. Also, the level of expenditures are determined in great part by a State's economic plight -- i.e. its ability to support not only public education but also all other needed public services.

Educational costs, however, are not only a function of revenue sources, but also of the goals and objectives

which persons have determined public education should accomplish. We have developed this theme in Chapter 3. The world has thrust upon public education many challenging forces. Many calling for change and reappraisal of our ideals and democractic institutions. We have touched upon the strategies and tactics emerging in public education to cope with these educational challenges.

In Chapter 4, we discussed one of the most potent forces creating conditions for change in financing public education -- the courts. Both the Supreme Court and the various State courts have affected policies for financing public education. Some of these decisions were rendered in ways unforeseen and unimagined by early school finance experts such as Cubberley, Mort, and Strayer. Yet, despite the recent court decisions regarding fiscal reform, inequalities in financing public education continue to exist and in some States more today than in the past.

THE RESEARCH DESIGN

Chapter 5 contains a description of the research design used in this study. First, we wanted to document the differences in school quality related measures between high and low expenditure level districts. Second, because a number of States set as goals for finance reform a narrowing of the expenditure level gap, we studied the effects of different per pupil cost levels along the expenditure

level continuum on school quality related measures. Third, we utilized an administrative model for assessing the flow of expenditure level into school quality related measures. This model was developed by Professor Paul R. Mort and called the Sequential Simplex Model.

The Sequential Simplex Model[1] theory is described tersely in Chapter 6. Our intentions were just not to discover some research findings isolated from all other educational forces making for change, but to describe them in an overall educational research model. The Sequential Simplex Model served as an exceptionally good one to trace the flow of past and present community decisions (at the local, State, and Federal levels) into the creation of the educational climate for spending. The level of these expenditures for public education are transformed by school system policies into salaries, class size, staffing ratios, etc. These financial decisions affect the quality, quantity, experience and training of the staff employed to teach children. Such staff characteristics in the schools and individual classrooms affect how teachers teach and pupils learn -- i.e. the quality of education children receive.

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1 For a complete description of the theory of this model, see Paul R. Mort and Orlando F. Furno, Theory and Synthesis of a Sequential Simplex, "A Model For Assessing the Effectiveness of Administrative Policies," Teachers College, Columbia University, 1960.

Sample
Selection

Although a sample of school districts could have been utilized, all the school districts in a large, relatively wealthy Northeastern State (New York) were used. The State contained over 700 local school districts, of which 705 were used in this study. The districts varied in pupil population from less than 100 pupils to more than one million and in area from less than one square mile to several hundred.

Districts were divided into several different categorical expenditure level groupings: (1) ten groups (deciles) of approximately 70 school districts per group; (2) seven groups of approximately 100 school districts per group; (3) fourteen groups of approximately 50 school districts per group; and (4) twenty-eight groups of approximately 25 school districts per group. Although critical ratios were computed for all school quality-related measures for all groupings between each possible pair of expenditure levels, only those for the fourteen groupings were reported in detail herein in Chapter 6. Also, for the decile groupings, only the lowest and highest decile grouping comparisons were reported (Chapter 6). Findings on the various other group comparisons will be reported in a later study.

Data Collection -- School
Quality Related Variables

Data were collected on each of 705 school districts for the 1975-76 school year. Although all of the findings reported herein were based on the 1975-76 school year data, iteration of various statistical tests on 1976-77 school year data indicated that the findings based on the 1975-76 data were applicable to the 1976-77 data. These variables were grouped in terms of several broad categories involving revenue, expenditures, staff training, pupil-staff ratios, and pupil test data.

The complete list of variables studied is reported in the Appendix. Of these variables, only the following were reported on herein:

Expenditure Variables.

1. Expenditure Level (Current operating expenditures per pupil)
2. Total Expenditures for Instructional Services Per Pupil
3. Total Expenditures for Instructional Materials and Supplies Per Pupil
4. Total Expenditures for Textbooks Per Pupil

Wealth, State Aid, Revenue Variables.

1. 1975 Full Value/1975-76 Pupils (RWADA)
2. True Tax Rate For All Educational Purposes
3. Total State Aid Per Pupil
4. Total Operating Aid Per Pupil

Teaching Salaries And Staffing Standards.

1. Average Professional Salaries, Grades Kindergarten through 6
2. Average Professional Salaries, Grades 7 through 12
3. Total Professional Staff Per 100 Pupils
4. Classroom Teachers, Grades Prekindergarten through 6 Per 1000 Pupils
5. Classroom Teachers, Grades 7 through 12 Per 1000 Pupils
6. Total Classroom Teachers Per 1000 Pupils
7. Other Professional Staff, Grades Prekindergarten through 6 Per 1000 Pupils
8. Other Professional Staff, Grades 7 through 12 Per 1000 Pupils
9. Total Other Professional Staff Per 1000 Pupils
10. Percentage of Teachers with Bachelor Degree
11. Percentage of Teachers with Bachelor Degree plus 30 semester hours
12. Percentage of Teachers with Master's Degree
13. Median Number of Years Teaching in District in Which Presently Employed

Pupil Performance Variables.

1. Median Score Made By 3rd Grade Pupils in the District on a Pupil Evaluation Performance Mathematics Test
2. Median Score Made By 6th Grade Pupils on a Pupil Evaluation Performance Mathematics Test
3. Median Score Made By 9th Grade Pupils on a Pupil Evaluation Performance Mathematics Test
4. Median Score Made By 3rd Grade Pupils in the District on a Pupil Evaluation Performance Reading Test

5. Median Score Made By 6th Grade Pupils in the District on a Pupil Evaluation Performance Reading Test

6. Median Score Made By 9th Grade Pupils in the District on a Pupil Evaluation Performance Reading Test

7. Percentage of 3rd Grade Students Who Scored Below a Minimum Competency Level on Mathematics Test

8. Percentage of 6th Grade Students Who Scored Below a Minimum Competency Level on Mathematics Test

9. Percentage of 9th Grade Students Who Scored Below a Minimum Competency Level on Mathematics Test

10. Percentage of 3rd Grade Students Who Scored Below a Minimum Competency Level on Reading Test

11. Percentage of 6th Grade Students Who Scored Below a Minimum Competency Level on Reading Test

12. Percentage of 9th Grade Students Who Scored Below a Minimum Competency Level on Reading Test

Statistical Analysis in
The Research Design

The research design selected was a simple one. The districts were sequenced in accordance with a criterion variable. Then districts in the lowest decile were segregated as were those in the highest decile. Median values on some 50 school quality related variables were computed for those districts in the lowest decile and compared to the median values for those districts in the highest decile.

The critical ratio test for median values was used to test the significance of the differences in median values between the lowest decile districts and the highest decile districts.[1]

$$t = (M_{d1} - M_{d2}) / (\sigma_{Md1}^2 + \sigma_{Md2}^2)^{1/2}$$

$$\text{where } \sigma_{Md} = 1.2533\sigma / (N-1)^{1/2}$$

Two dependent variables were used for sequencing to obtain the lowest and highest decile districts: (1) expenditure level; and (2) wealth. The research design provided for separating districts by various expenditure level groupings and applying critical ratio "t" tests to median differences for the various quality related variables studied. The same procedure was followed for separating districts by various wealth groupings.

Although zero order correlations, multiple order correlations, partial order correlations, and part order partial correlations were computed, the results were not reported. The object of the research design selected herein was to focus on only the simplest statistical analysis of the data and to do so through the Sequential Simplex Model Theory. For this reason, only the reliability of the difference between median values of quality related variables was

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[1] Henry E. Garrett, Statistics In Psychology and Education, Longmans Green and Co., New York, 1951.

the statistic utilized for analysis purposes.

RESEARCH FINDINGS

Our intention here was not to reiterate the research findings reported in detail in Chapter 6. Instead, we tried to indicate in broad brush explanations, how States came to finance their public education systems from past developments, how some States were affected by recent court decisions, and how such changes have affected the quality of education children receive because of State fiscal reforms.

In the beginning, of course, States financed their public schools in a variety of ways already detailed in numerous school finance books. Cubberley (1905) was one of the first finance experts to suggest a uniform State approach to financing public schools. Cubberley's approach to financing education was embodied in (1) reward for effort (by which he meant aids for specific purposes) and aid for equalization (by which he meant 'doles' to poor school districts). This was the dominant approach to State aid for several decades, or until the Strayer and Haig approach in the early twenties.

Strayer and Haig moved away from the Cubberley "reward for effort" and "bit-by-bit" vectorial approach as the core of State policy for financing education. They proposed large amounts of funds be used for equalization aid.

This was to be done by means of a foundation program embodying the concept of tax equity (equalization of tax burdens). Their approach as honed by Paul R. Mort influenced most States on how they should finance public education. Unfortunately, the flaw in their theory was not in their equalization approach but in the level of equalization -- i.e. equalization was to be achieved but only up to a certain point for school expenditures and tax burdens. Above this point schools could spend what they wished. Thus, the seeds for disequalization of expenditure levels and tax burdens were sown. The harvest reaped was inequalities of educational opportunities for children.

With the Serrano decision, several competing concepts were studied with the expressed purpose of resolving the inequalities of educational opportunities created by the foundation level approach. One such approach was District Power Equalizing. The core of this approach was the equalization of tax burden. One mill, through local and state efforts, would raise the same amount of money regardless of district wealth. Though this was proposed as a solution to the foundation program approach, it resolved only the tax equity principle and even here not as much as its proponents indicated. Equality of education opportunities was still being greatly violated. Expenditure levels still differed as greatly as before. Tax equity was being achieved but at the expense of violating other sound principles, particularly balanced judgements. In the history of school

finance, we have concluded that District Power Equalization has run its course as a core for State fiscal policy. It has, however, stirred much thinking and analysis with regard to State fiscal reforms. Thus, it has served a very useful purpose.

We have found, as did Brown[1] and others, that disparaties in expenditure levels have increased, not only in New York State, but also in States which have had fiscal reform. Figure 6.6 in Chapter 6 shows graphically the widening expenditure level gap in New York State.

Another approach to State fiscal reform, exemplified by the Serrano II decision, was closure of the expenditure level gap. Other than the fact that expenditure levels among districts within a State were to be confined to less than a stipulated amount, say $100 per pupil, little evidence has been presented as to the qualitative and quantitative effects of such a State policy. What do high expenditure districts get that low ones don't? Moreover, how do districts at relatively small expenditure level differences vary with respect to school quality related measures? Are these variations the same for districts being compared at the lower end of the expenditure level continuum as those being compared at the upper end? Utilizing the Sequential Simplex Model as the theory, we have sought answers

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[1] Lawrence L. Brown III, and others, School Finance Reform in the Seventies: Achievements and Failures, September 30, 1977, ASPE, HEW, Washington, D.C. p. 3.

to these questions.

For the school districts studied herein, high expenditure districts (tenth decile) spent twice as much as low expenditure districts (first decile), or $2538 per pupil compared to $1148. Table 1 in Chapter 6 contains the statistical data, cases, standard error of the median, and critical ratio "t" tests. As we indicated at the outset, only a few rather than all the significant findings were to be discussed in the summary. The reader desiring greater detail has been referred to the appropriate section in the main body of this research report. High expenditure districts compared to low expenditure level districts spent significantly more per pupil for textbooks, were significantly more wealthy ($98,841 per pupil compared to $27, 272), taxed themselves almost twice as much (22.26 mills to 12.70), paid elementary teachers higher salaries ($16,832 compared to $10,299) paid secondary teachers higher salaries ($18,072 to $11,248), employed significantly more professional staff per 1000 pupils (system-wide, 73 per 1000 pupils to 53), had teachers with significantly more education (39 percent had masters degrees compared to 23 percent), and had pupils who scored significantly higher on reading and mathematics tests. These findings clearly indicate that the district power equalization approach, or any approach for that matter which results in increasing the expenditure level gap among school districts, creates significant differences in school quality related measures. The consequences of these differences are

related to inequality of educational opportunities.

The previous paragraph highlighted differences between the extreme high and low expenditure level districts (decile groupings). Questions related to differences in expenditure level along the expenditure level continuum were also raised. Some answers to these questions were furnished in Chapter 6 in the section entitled "Disequalizing Effects on School Quality Measures of Expenditures at Fourteen Different Cost Levels." Again utilizing the Sequential Simplex Model theory, the flow of wealth into expenditure level was analyzed, the flow of expenditure level into expenditures for instructional services was traced and evaluated, and the flow of expenditures for instructional services into salaries, staffing adequacy ratios, and staff characteristics and the subsequent flow of these quality related variables into pupil performance measures were also analyzed. A number of graphs in Chapter 6 depict these flows and their significance.

Our findings indicate that there is much to be learned about the effects on school quality of limiting differences in expenditure levels. The statistical procedures presently available such as critical ratio "t" tests, analysis of variance and co-variance, partial and part order correlation, and multiple regression analysis are inadequate to test the significant effects of the flow of expenditures into school quality related variables. Nevertheless, the approach taken yielded several significant findings and should

be pursued further.

First, as expenditure levels increase, so do per pupil expenditures for instructional services. The relationship is high, positive, and very significant. However, as per pupil expenditures for instructional services increase per pupil expenditures for textbooks increase, but per pupil expenditures for instructional materials and supplies do not. Why not? Second, as per pupil expenditures increase, professional salaries increase at a faster rate than pupil/staff ratios. State finance plans should probably be designed in such ways that increased State aid must first be used to upgrade pupil/staff ratios to acceptable levels before salaries could be increased. Third, designers of State aid finance plans could create simulation models using the Sequential Simplex Model Theory to see the effects of decisions upon quality related variables rather than just tax equity, closing the expenditure level gap, etc. Such a model could yield a quality related variables profile whose characteristics would be useful in determining the equalizing or disequalizing effects of certain State aid finance policies and plans. Fourth, expenditure level differences at the lower end of the expenditure level continuum result in different effects upon school quality related variables than expenditure level differences at the upper end. For example, an expenditure level difference between the two lowest groups produces significant differences in professional staffing ratios whereas a much higher difference

between the two highest groups does not. Lastly, Brown[1] projected the cost of reducing expenditure level disparities to 20 percent of current levels to be about $5.4 billion in 1975. Are the high costs of convergence worth the price? The Sequential Simplex Model Theory represents an approach to study the effects of the flow of expenditures into school quality related variables.

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1 Lawrence L. Brown III, and others, School Finance Reform in the Seventies: Achievements and Failures, September 30, 1977, ASPE, HEW, Washington, D.C. p. 3.

CHAPTER 2

FISCAL SETTING FOR SCHOOL EXPENDITURES

A half decade ago, Rosenbaum[1] wrote in The New York Times that "the school system of nearly every large city in the country is in desperate financial straits, and budget deficits, teacher layoffs, and reduced services in the schools are the rule rather than the exception." Today, not only are great cities in financial straits but so also are many other local school districts and a few States.[2] Bahl[3] points to a pessimistic outlook for the State of New York.

Why is public education in such dire straits in one of the richest countries in the world? Are expenditures being made for non-related school quality purposes? Before making an analysis of these questions, it would prove helpful to all concerned to review briefly the fiscal setting for school expenditures, the goals and objectives set forth for public education, and the need for school finance reform. Following

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1 David E. Rosenbaum, The New York Times, "Financial Problems Plague Schools Across the Nation," Monday, March 15, 1972.

2 Felician F. Foltman and Peter D. McClelland, New York State's Economic Crisis: Jobs, Incomes, and Economic Growth, Cornell University, 1977, 244 pp.

3 Roy Bahl, "The Long Term Fiscal Outlook for New York State," paper prepared for a Conference Planning for Change: The Case of New York State, State University of New York at Binghamton, November 8, 1976.

this we will describe the research design to test whether or not the effects of expenditure levels upon school quality are disequalizing, and then discuss the statistical results and their significance for state fiscal policy.

TRENDS IN COSTS PER PUPIL FOR PUBLIC EDUCATION

Over the more than seven decades of this century, public elementary and secondary school expenditures increased at an almost exponential rate - doubling and in some decades tripling. As can be seen from Figure 2.1, expenditures for public education have typically doubled from one decade to the next and in one instance tripled. Another way of looking at trends in public school expenditures is in terms of per pupil costs. Figure 2.2 depicts these per pupil costs.

Determinants of School Costs

School costs are the products of many conflicting, confusing, and confounding forces.[1] Some of the most important ones are:

1. Number of pupils to be educated.
2. Number of school teachers employed to educate these pupils.
3. Level of teachers' salaries.

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[1] National Education Association, "Why Schools Cost More," Research Bulletin of the National Education Association, Vol. XVI, No. 3, May, 1938.

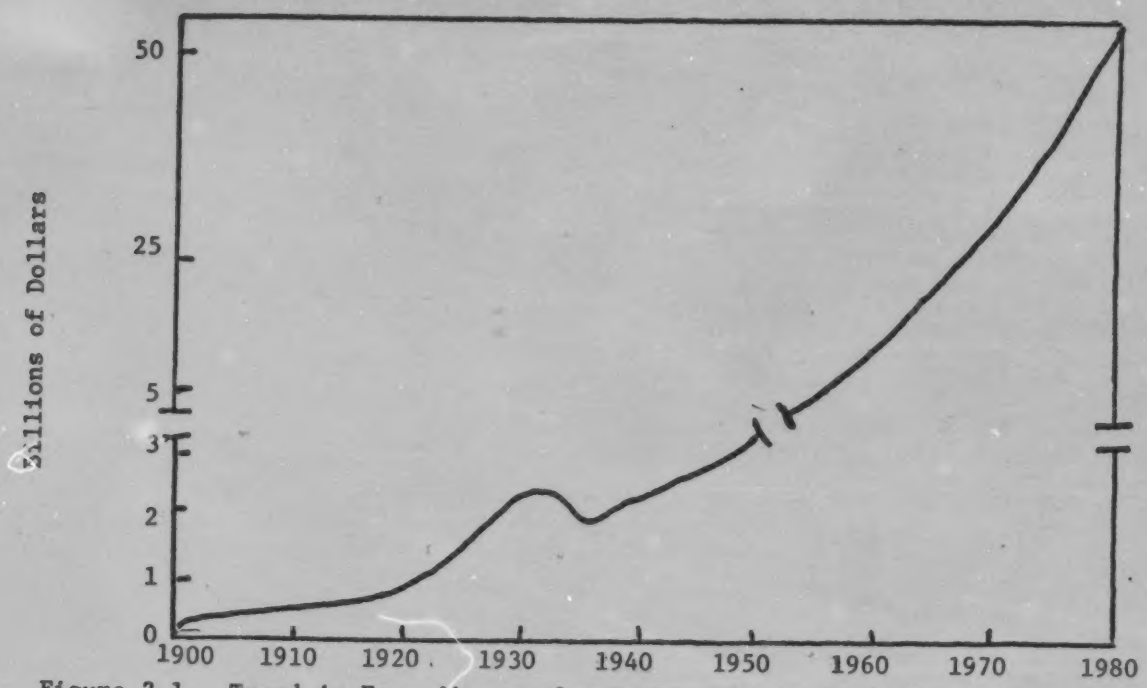

Figure 2.1. Trend in Expenditures for Public Elementary and Secondary Schools 1900 to 1970 With a Projection for 1980.

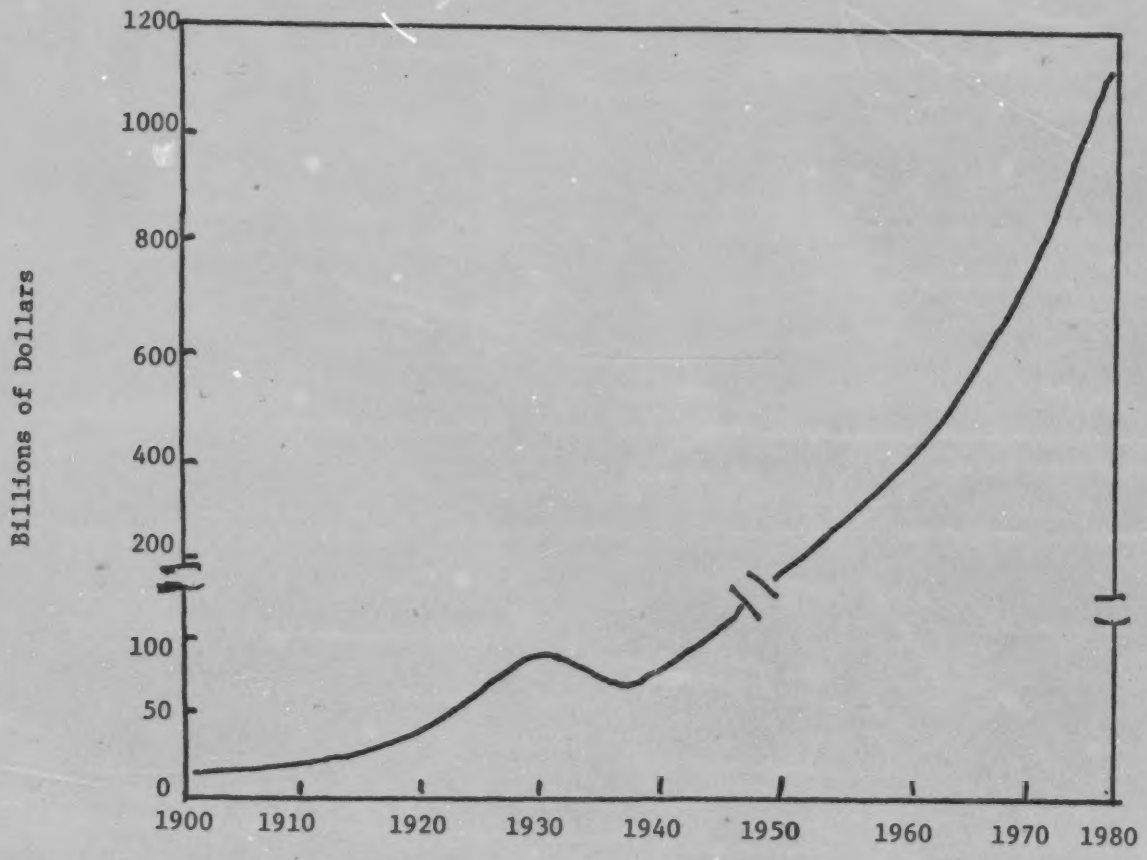

Figure 2.2. Trend in Expenditures for Public Elementary and Secondary Schools Per Pupil Enrolled From 1900 to 1970 With a Projection for 1980.

4. Quality of educational programs desired.

5. Provisions for equality of educational opportunities for all students.

6. Teaching materials -- both their quality and quantity.

7. School facilities -- in particular, construction costs, number of classrooms to accommodate increased pupil enrollments and number to provide for the replacement of obsolete facilities.

8. Class size.

9. Total number of professional staff members per 1000 pupils.

10. Number of noncertified, noneducational staff members (custodians, maintenance workers, clerical employees, aides, etc.).

ECONOMIC PLIGHT OF STATE'S ABILITY TO SUPPORT EDUCATION

The economic decline of Northeastern States, and in particular of New York State, relative to the economy of the nation as a whole has been well documented.[1] Yet even in the face of economic decline, spending cuts cannot be easily made. Each public sector has its proponents and detractors. In which areas of the public sector are State Legislatures and

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[1] David Puryear and Roy Bahl, Economic Problems of a Mature Economy, Occasional Paper #27, Metropolitan Studies Program. The Maxwell School, Syracuse University, April, 1976.

William H. Miernijk, "The Northeast Isn't What It Used To Be," Balanced Growth for the Northeast, New York State Senate, 1975.

Christopher Carlaw, Boston and the Flight to the Sunbelt, Boston Redevelopment Authority, Boston, Massachusetts, October, 1976.

local governments to cut? Water, sanitation? Education? Public Welfare? Health Services? Police? Fire? Clearly, resource allocations in States facing economic declines will not be lightly made. Various groups[1] including those in education, will exert great pressures on legislators and program administrators in regards to how limited resources should be allocated.

Relative Revenue Contributions of Local, State, and Federal Governments for Public Education[2]

In 1900 of the $214 million spent for education, local governments contributed 89 percent; state governments, 17 percent; and the Federal Government, 4 percent. In 1978, almost eight decades later, local governments will contribute an estimated 48 percent of the funds spent on public education; State governments, 44 percent; and the Federal Government, 8 percent. The lion's share of local revenue for the support of public education comes from property taxation -- about 98 percent. The question of equalization of tax burdens[3] raised more than half a century ago by Strayer and Haig[4] still remains as an important issue requiring resolution as recent court cases attest.

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[1]Charles L. Schultze, The Politics and Economics of Public Spending, The Brookings Institute, Washington, D.C., 1968.

[2]United States Department of Health, Education, and Welfare, National Center for Educational Statistics, Statistics of Public Elementary Day Schools, Fall, 1975.

[3]Edward B. Fishe, The New York Times, "How Fair Are Schools Paid For By Taxes on Property," June 19, 1977.

[4]George D. Strayer and Robert M. Haig, The Financing of Public Education in the State of New York, The MacMillan Company, 1923.

CHAPTER 3

GOALS AND OBJECTIVES FOR PUBLIC EDUCATION

Educational costs are not only a function of revenue sources but also of goals and objectives. Education has its cost determiners. Most of the factors which escalate costs are in the area of management rather than performance objectives. For example, it's easy to cost out what 60 professional staff members per 1000 pupils at given salary levels would cost. But it's more difficult to indicate how many dollars are needed so that a specific reading program will result in a specified increase in reading scores on a specified standardized test battery for a specified number of students over a specified period of time.

What public education will cost depends upon what persons want education to accomplish. What persons want education to accomplish depends upon what challenges are emerging for society. To unfold a quality educational program requires an intimate knowledge of the significant changes engulfing our world, as well as a profound understanding of the agents of change and its processes. What changes are taking place, how they are taking place, and who are the agents of change must be clearly understood and appreciated. For in the schema of life, such changes represent the problems that school officials must resolve, if they

and the institutions they hold dear are to survive.

In reality, emerging challenges such as changing values, the population explosion, the knowledge explosion, the struggle for power to control the schools, impinge upon education as a social institution. What we are concerned with here is the means -- the goals and objectives -- by which education seeks to meet these emerging challenges. Without belaboring the point, only people can secure the attainment of defined goals and objectives. But we have two groups, sometimes in direct conflict and confrontation concerned with education's goals and objectives: (1) those who control the educational institutions and pay for them; and (2) those who control the educational process. Both groups require continuous, mutual interactional analysis. There must be a flow of feedback data and ideas, or systems monitoring, occuring in both directions if the needs of one group are to be satisfied by the other. Without such a process, eventually each group will become unaware and unconcerned about the other.

EMERGING CHALLENGES OF CHANGE FOR PUBLIC EDUCATION

Today many new forces are at work within our society calling for change and reappraisal of our ideals and democratic institutions. Political, social, economic, psychological, and educational forces rend our society. All contain challenges as well as opportunities. All affect in complex

ways educational support levels. These forces calling for change are (1) changing values and ideals; (2) the knowledge explosion; (3) the population explosion; (4) the struggle for power to control the public schools; (5) the chemistry involved in pupil learning; and (6) the new educational technological inventions.

Changing Values. Over the centuries, the experiences of human history record the fact that values and ideals change. As our forefathers did before us, we search today for stable foundations upon which to build a democratic, humane society -- not just for ourselves, but mainly for our children and grandchildren. What we dreamed of as ideals, our children now discard as irrelevant. We are learning the painful lessons that our youth do not want today's world to be like yesterday's. Thus, what we looked upon as touchstones yesterday, gather dust today; what we regard as ideals now, our children may discard tomorrow. Changing values represent an emerging challenge educators will have to face.

Knowledge Explosion. Each year the rate at which new knowledge is created grows exponentially. No longer can any one person be expected to know all the knowledge recorded in our encyclopedias or great books of knowledge. In fact, it's almost impossible now for a person to know all the documents that exist in his field much less read them and understand thoroughly what is in them. Let me illustrate. In the scientific and technical areas alone, we are being

swamped by an ever-growing amount of research findings and published information. Each year there are now published some 55,000 scientific journals, some 100,000 technological reports, and more than 10,000 scientific books. The Journal of Geophysical Research has tripled its contents over the past decade. Over the past half decade, published scientific papers have more than doubled. And still, the rate at which new knowledge is generated continues to quicken. The explosion of new knowledge represents an emerging challenge that educators cannot escape.

Population Explosion. In 1900, the world's population stood at 1.65 billion persons. Such a development took place over the earth's 3 to 4 billion years of existence. In 1970, the world's population was estimated to be more than three billion persons. Thus it took only 70 years for the world's population to more than double. Without population control, the world's population will double again by the year 2000.

Mankind's achievements in roads, schools, housing, industry, and health will be to little avail if over the years more and more people will be experiencing less and less desirable standards of living. Over the next 15 years, the world must be prepared to feed an additional one billion persons. Never before in history have so many persons been added to the world's population in so short a period of time. Such a development will result in a growing imbalance between food and persons. It will threaten not only the economic

and political stability of underdeveloped nations but also of highly developed nations. It could trigger a nuclear war. If the same national economic resources were applied to slowing population growth rather than to accelerating production growth, such resources could be many times more effective in raising living standards or per capita outputs.

Struggle for Power in the Public Schools. Throughout the course of human history men have always contrived excellent reasons for either depriving other individuals of their rights, or failing this, for narrowing their exercise of them. In times of crisis a most persuasive reason advanced by such men has been the claim to be acting for the common good, or for national unity, or for national preservation. Over the ages many persons have risen to positions of national leadership. Too often these same persons instituted despotic controls to consolidate their positions and perpetuate their authorities. A most powerful weapon for accomplishing this has been and still is education.

The present struggle for power in the public schools represents a conflict for control. Who should control the public schools? Should the public schools be the private preserve of a particular group or groups? Of all the forces interested in controlling education, should we dare entrust the job to a single group? Should not educational systems offer all persons affected by the educational process opportunities to be heard and to have their ideas considered?

Since education occupies sucha compelling and vital

role in our society, we should not be surprised that many groups seek to control it. Such struggles for the power to control public education represent an emerging challenge in which educators must intimately involve themselves.

The Chemistry of Learning. Regardless of the extent of the technological revolution in the innovative hardware of education, unless we know more about how people really learn, such developments will be of little avail. Computer-assisted instruction, cartridge-loading projectors, microtransparencies, and other devices cannot be effectively utilized in the learning process until the theories of learning are transformed into actual performance. Research now being conducted indicates that aptitude in young children is mutable and very much subject to enlargement or retardation. We know that children who are exposed to lively environments from infancy seem to be brighter than those who are not.

Presently, there is available a fairly extensive class of drugs which can facilitate or retard learning and memory. However, such drugs have been tested principally on animals rather than on persons. Collaboration in basic research between the educator, psychologist, psychiatrist, and neurobiochemist should provide answers to such questions as: What kind of educational environment can best develop the brain chemically and morphologically? What kind of stimulants and stimulations make for the best enriched, learning environment? What educational experiences can potentiate best the effects of drugs on learning? In the

shape of education to come, the chemistry of learning lore will loom large.

The New Educational Technology -- The Shape of the Future. Men have always speculated about the future, both for fun and profit. If we presume that the earth will not be destroyed in a nuclear holocaust, we need not dream in complete fantasy to note the shape of the future for the new technology in education. Surely, computers will be the key to the new innovative, technological hardware to be used in the teaching-learning process. But technological innovations in education won't be limited to computers. Overhead projectors will be used in more imaginative ways than presently. So will closed circuit television and picture phone communications. Computer-assisted instruction will also be programmed for adaptations that emphasize learning skills other than drill and rote memory. Advancing technology will also greatly influence the design of tomorrow's school. School construction techniques will undoubtedly be centered around electronics aids to learning -- particularly computers, television, projectors, and devices controlling space learning environments. When space learning environments can be electronically controlled and changed at will, team teaching will truly come into its own. These new technological developments will present some great challenges to those who control public education.

EMERGENCE OF QUALITY EDUCATION - A FOCUS ON GOALS AND OBJECTIVES

The emerging challenges of change just enumerated make it incombent upon school leaders charged with the responsibility for educating youth to reevaluate continuously education's goals and objectives. The Rockefeller Report on Education[1] did so as did the Educational Policies Commission[2] and more recently the Board of Regents of the University of the State of New York.[3] Some goals which most schools subscribe to and seek to accomplish are:

1. To develop in each child the basic skills of reading, writing, arithmetic, spelling, and listening to the best of his potential.
2. To develop in each and every student a practical understanding and a working respect for the principles of self-government.
3. To prepare each young citizen to fulfill competently his responsibilites of adult citizenship.
4. To impart to each student the knowledge and skills that he needs to earn his own living.
5. To imbue in each student a sense of responsibility for his own personal development and ethical conduct.

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1 The Rockefeller Report on Education, The Pursuit of Excellence, Education and the Future of America, Doubleday & Co., Inc., New York, 1958.

2 Education Policies Commission, An Essay on Quality in Public Education, National Education Association, Washington, D.C., 1959.

3 New York State Board of Regents, Goals for Elementary, Secondary, and Continuing Education in New York State, New York State Department of Education, Albany, New York, February, 1974.

6. To instill in each student the proper attitudes and study techniques to permit him to assume effectively his own responsibility for self-study and for lifelong continuous learning.

7. And to inculcate in each child respect for the rights, dignity, freedom, and worth of each person whatever be his race, religion, creed, or ethnic background.

Even though these are not all the educational goals for which schools are responsible, they are the primary goals upon which budgets should be based. Granted that these goals aren't new or novel; they are the same ones our forefathers subscribed to when they first forged our nation.

STRATEGIES AND TACTICS FOR IMPLEMENTING EDUCATIONAL CHANGE

To effect change in American education so as to enrich and expand educational opportunities for all persons requires men, money, and materials. Paul R. Mort's[1] research studies showed that most changes in education take about 50 years to implement in the local school districts of America. Many men and organizations have tried to study the process of change and to isolate those variables that quicken or slow it. Early in these studies on adaptability it became apparent that the school should not be considered as an organism unto itself unaffected by the forces around it.

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1 Paul R. Mort, Educational Adaptability (Metropolitan School Study Council, Teachers College, Columbia University, 1954).

Recently John W. Gardner[1], former Secretary to Health, Education, and Welfare, offered five keys to leadership in changing and redesigning educational institutions. They were: (1) a change in the framework of order; (2) equal access to opportunity; (3) a renewed quality of life with emphasis on the importance of the individual to society; (4) the imbedding of values in the laws of the nation; and (5) society must change the ways in which people live together. Gardner went on to state that change in the framework of order must be responsive to human needs because without order society cannot offer the individual freedom and justice.

Criteria for Change

To suggest a design for financing education without touching upon criteria for effecting change is like trying to study microorganisms without a microscope. Some criteria for change that must be considered are the following: (1) adaptability; (2) flexibility; (3) objectivity; (4) simplicity; (5) stability; and (6) feasibility. The intent here is not to minutely define these criteria but merely to indicate that in a design for financing education in order to obtain quality education such criteria must be considered.

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1 John W. Gardner, Guideposts to Leadership. Address at the 1968 National M.I.T. Alumni Offices Conference, Cambridge, Massachusetts, September, 1968.

Introduction of Change Agents

At the outset we briefly touched upon agents of change that would be powerful enough to effect a change in programs for financing education. The most potent change agents are ideas and money. The right idea expressed by the right man at the right time will spread almost as quickly as a new song hit among our teenagers. Incentive provisions, money, prestige, recognition, are also powerful agents for effecting change. It has become increasingly evident over the past twenty years that change, innovation, and organizational renewal must be a constant preoccupation of the effective school administrator.[1] A structural device often used to effect change is the task force or project team approach which serves, then, three functions: (1) cross fertilization of ideas; (2) opportunity for change of setting for employees who are otherwise getting in a rut; and (3) the concentration of brain-power on a specific problem.[2]

Barriers in the Path of Change

Surely, the design of a quality educational program is important, and complex. The more costly, the more complex, the more important the need for a quality educational program, the more critical is the need for specific directions, plans, and objectives. Unfortunately in education few school districts educate pupils utilizing specified objectives to be accomplished. Few state departments of

education have outlined specific and measurable objectives for the courses they require and certify. One barrier, then, in the path of change for quality educational programs is the lack of written, clearly defined, and measurable objectives.

Surely, the most important accomplishment that can occur in any educational program is for pupils to learn not just anything -- but the specific knowledge they need to operate effectively as citizens in adult life. One way, and perhaps the only sure way, to tell if such learning has taken place is to test for it. Unfortunately, school courses seldom in their design specify performance objectives, i.e., what are pupils to really learn. A second barrier in the path of change is the lack of standardized measuring instruments with respect to what staff is to accomplish and what pupils are to learn. A final barrier in the path to change is loyalty to outdated teaching procedures and the reluctance to utilize the modern technological devices presently available for instructional purposes. Professors in educational institutions, including teachers of teachers, "teach the way they were taught." Consequently inefficient, ineffective, and uneconomical teaching systems are perpetuated.

CHAPTER 4

THE NEED FOR REFORM - POLICIES FOR FINANCING EDUCATION

In reality, is it not naive to design, develop, and declare a policy for financing public elementary and secondary education without spelling out in management and performance objectives what public education is to accomplish? What will be the prospects for needed state fiscal reform when clouded by lack of agreement on education's goals and objectives? Should public educators ask for money just for money's sake? Any policy for financing education cannot be sound and enduring nor fair and just if predicated upon the heart rather than reason, if based on prejudice rather than objectivity, and if developed from fantasy rather than fact.

RECENT COURT DECISIONS RE FISCAL REFORM

Any policy which states adopt regarding the financing of education must pass the test of constitutionality. In the implementation of state fiscal policy, equity guidelines[1] should be rigorously followed.

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[1] The United States Office of Education published a set of equity guidelines subsequent to the enactment of Public Law 83-380, Section 842, Title VIII of the Education Amendments of 1974 for school finance reform studies.

Former Chief Justice Wright[1] of the California Supreme Court in commenting upon the Serrano vs. Priest[2] case stated that public school financing laws should be so devised that all persons benefit equally from them. States have permitted their school finance programs to develop in such ways that have apparently violated sound guiding principles. Over the years, the courts have ruled that: (1) the quality of a child's educational program shall not depend upon the wealth of the school district in which he resides; (2) the state does not have to require that all districts spend the same amount of money; (3) the state does not have to require that each and every district offer identical educational programs; (4) that the burden of supporting educational programs not fall unequally upon different groups of taxpayers; and (5) that the burden of supporting educational programs not fall solely or unequally upon one class of wealth. Meeting these conditions doesn't necessarily require state legislatures to spend more money for education. Less money for education could be the result depending upon the goals and objectives that have been mandated for education to achieve.

Although the object here is not to dwell in detail upon the court cases which have forced state school fiscal

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1 Chief Justice Wright, The California Supreme Court and School Finance, "Has the Fourteenth Done It Again?" Published by American Association of School Administrators, Washington, D.C., 1972.

2 Serrano vs. Priest, Cal. 3d 584 (August 30, 1971). Termed Serrano I.

reform, a brief review of the most significant court cases is certainly in order here.

Shortly after the California Supreme Court decided the Serrano case, the Federal District Court in Minneapolis, Minnesota, decided that the Minnesota State Finance Plan[1] was unconstitutional because it violated the Fourteenth Amendment. This court stated: ". . .the heaviest burdens of this system surely fall de facto upon those poor families residing in poor districts who cannot escape to private schools. . . ." Why should parents either poor or rich be made to feel that they have a right to send their children to private schools only if they foot the bill? The author contends that the federal Constitution is being violated a priori when local, state, or federal governments fail to support the full costs of educating children in both private and public education.

A federal three judge court in Texas soon followed with a similar conclusion. However, that case was appealed and reached the United States Supreme Court.[2] Surprisingly, the court rejected the reasoning of Serrano I. Rather than holding that education was a "fundamental right", the court stated that since there was no showing of any definable category of 'poor' persons that was discriminated against, or that

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1 See Van Dusartz v. Hatfield case.

2 See Rodriquez et al vs. San Antonio School District, Texas case.

there was any discrimination based upon relative family income within districts, and since district wealth discrimination against residents of less wealthy districts did not meet the criteria of a suspect class, the strict judicial scrutiny test did not apply. Thus, the traditional standard of review under the equal protection clause, i.e., a showing that the State's action had a rational relationship to legitimate State purposes, would be sufficient. Thus, under the traditional equal protection test, the Texas financing system, despite its conceded imperfections, rationally furthered a legitimate State purpose. Because the system provided for State contributions to each district, assured a basic education for every child, permitted local control and participation by local taxation, the Texas system for financing public education was ruled constitutional.

Although the Rodriguez decision would seem a severe setback to those arguing for school finance reform, the proponents of reform have simply shifted their focus to the State courts, and relied upon the equal protection clauses and education provisions of the challenged State's constitution.

New Jersey is one State in which the finance system was challenged. The State Constitution provided for:

> . . .the maintenance and support of a thorough and efficient system of free public schools for the instruction of all the children in this State between the ages of five and eighteen years.1

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1 N.J.S.A. 18A:7A-4.

The court interpreted 'thorough and efficient' as

> The goal of a thorough and efficient system of free public schools shall be to provide to all children in New Jersey, regardless of socio-economic status or geographic location, the educational opportunity which will prepare them to function politically, economically, and socially in a democratic society.[1]

Shortly after the Rodriguez decision, the New Jersey Supreme Court decided that

> The question whether the equal protection demand of our State Constitution is offended remains for us to decide. Conceivably, a State's Constitution could be more demanding (than the Federal). . . We then go to the question whether our State guarantee of equal protection is offended.[2]

The court refused to apply the State guarantee of equal protection to the case.

> We hesitate to turn this case upon the State equal protection clause. The reason is that the equal protection clause may be unmanageable if it is called upon to supply categorical answers in the vast area of human needs, choosing those which must be met and a single basis upon which the State must act.[3]

However, the court did rely upon the 1875 Amendment to the New Jersey Constitution cited above.

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1 Robinson v. Cahill 62 NJ at 490, 491. (1973)

2 Robinson v. Cahill 303 A.2d 273a+282.

3 Robinson v. Cahill 303 A.2d at 492.

> . . .It cannot be said that the 1875 Amendments were intended to ensure statewide equality among taxpayers. But we do not doubt that an equal educational opportunity for children was precisely in mind. The mandate that there be maintained and supported 'a thorough and efficient system of free public schools for the instruction of all the children in the State between the ages of five and eighteen years' can have no other impact.[1]

The court agreed with the trial court that the constitutional demand had not been met because of discrepancies in the dollar input per child. The court reluctantly accepted that criteria because the State Department of Education had never "spelled out the content of the educational opportunity the Constitution requires."

> Without some such prescription, it is even more difficult to understand how the tax burden can be left to local initiative with the hope that statewide equality of educational opportunity will emerge.[2]

The court also made clear that the constitutional mandate does not require equal expenditures.

> We shcuild not be understood to mean that the State may not recognize differences in area costs, or a need for additional dollar input to equip classes of disadvantaged children for the educational opportunity. Nor do we say that if the State assumes the cost of providing for

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1 Robinson v. Cahill 303 A.2d at 513.

2 Robinson v. Cahill 303 A.2d at 516.

> constitutionally mandated education, it may not authorize local government to go further and to tax to that further end, provided that such authorization does not become a deviation diluting the State's mandated responsibility.[1]

As a result of the Serrano decision cited above, the California Legislature enacted changes in the foundation plan designed to counter the original complaint. The trial court permitted the complaint to be amended to include the newly enacted statute, which still relied heavily upon the property tax. On December 30, 1976, the California Supreme Court held the new law unconstitutional.

The Legislature had attempted to adjust equalization aid and tax rate limitations and overrides and substantially increase the foundation program to bring the financial system into constitutional conformity. It was hoped by a system of spending 'caps' and increases in the foundation plan to produce 'convergence.'

The court found the system flawed.

> . . .it will allow total 'convergence' between high spending revenue limits and rising foundation levels only after many, perhaps as many as 20, years -- even assuming no voter overrides. (emphasis in original) . . .Even when the 'convergence' has run its course, there will continue to be a substantial unequality between basic aid and equalization districts, again assuming no voted overrides, due to the fact that the former districts will be able to achieve the foundation level at a tax

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[1] Robinson v. Cahill, 303 A.2d at 520.

> rate which is less than the computational rate.[1]

The California Court concluded that "substantial disparities in expenditures per pupil among school districts cause and perpetuate substantial disparities in the quality and extent of availability of educational opportunities." Although the court indicated that equal expenditures were not required, substantial per pupil expenditure differences had to be reduced.

Perhaps the most interesting aspect of the decision is that irrespective of the Rodriguez case, the California Supreme Court applied the "fundamental interest -- suspect classification" test.

> Nor can the additional fact. . . that certain of the high court's former decisions. . .may not be expected to thrive in the shadow of Rodriquez cause as to withdraw from the principles we there announced (in Serrano I) on state as well as federal grounds. . . For these reasons, then, we now adhere to our determinations, first made in Serrano I, that. . .because the school financing system here in question has been shown by substantial and convincing evidence produced at trial to involve a suspect classification. . .and because that classification affects the fundamental interest of the students of this State in education, we have no difficulty in concluding today, as we concluded in Serrano I, that the school financing system before us must be examined under our State Constitutional provisions with that strict and searching scrutiny appropriate to such a case.[2]

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[1] Serrano vs. Priest 135 Cal. Rptr. 353 (Serrano II), 1976.

[2] Ibid, p. 367.

The court went on to describe workable, practical and feasible alternative methods which the legislature could have taken.

> Instead it has undertaken to create a school financing system which, by making the quality of educational opportunity available to a student dependent upon the wealth of the district in which he lives, is manifestly inconsistent with fundamental constitutional provisions guaranteeing the equal protection of the laws to all citizens of this state. That system, we hold today, can no longer endure.[1]

Thus it appears that since Rodriguez, school finance challenges will take place in state courts, subject to their interpretation of the applicable criteria. The Robinson and Serrano cases indicate that some of those criteria are: the provisions for education as stipulated by the State constitution; equal protection clauses of the State constitution; the discrepancy of expenditure and the discrepancies of wealth between districts.

Clearly, all these cases on state school financing indicate that the courts will look over the shoulders of the various state legislatures to see whether or not school financing plans as presently constituted or as to be developed meet the tests of state and federal constitutionality.

A question that should be raised at this point is: How will the courts affect school finance laws? First, the courts will not write the laws. The courts will not act as

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[1] Serrano vs. Priest 135 Cal. Rptr. 353 (Serrano II), 1976, p. 373.

State legislatures. Moreover, citizens should recognize that to change state financing laws will take time. Such a task cannot be done overnight. In the rewriting of these laws, (1) funds may not be distributed in such a way that the education of a child depends upon the wealth of a school district rather than the wealth of the state; and (2) the state does not have to require that all school districts spend the same amount of money or offer identical educational programs. Interestingly, some persons feel that these recent court cases will require State legislatures to spend more money for education. This simply isn't true. In light of the question raised previously, the courts are shaping educational policy, in these instances school finance laws directly; but, then, the courts have always shaped educational policy in the past and will do so in the future.

EDUCATIONAL GOALS AND OBJECTIVES RE FINANCING EDUCATION

A sound, practical educational policy for financing education cannot be achieved unless there is a consensus on what education should accomplish. Traditionally, school officials have stated education's goals and objectives in vague, nebulous, and lofty terms. Such goals were meant to impress, inflate, and infect the spirit and soul rather than to measure education's output precisely and quantitatively.

No one should minimize how difficult it is to reach

consensus on education's goals and objectives. Since man first started to educate his children, he argued about how to do it. In millenia past, Aristotle stated that "all people do not agree in those things they would have a child learn. . . ." He went on to declare that "from the present mode of education we cannot determine with certainty to which men incline, whether to instruct a child in what will be useful to him in life, or what tends to virtue, or what is excellent; for all of these things have their separate defenders." Today, no less than then, the debate on what schools should accomplish continues. What knowledge should children be exposed to in order to inspire them to greater wisdom? What specific skills should children be taught that would be immediately useful to them in coping with their life's problems? Even when goals for education are agreed upon, the question "How should children be taught?" evokes much heat and anger. Everyone will not agree today, any more than in the past, on what the schools should try to do or on how they should do it. Appraising today's educational goals and objectives and charting from this the future course of action schools should take is most difficult.

One problem associated with goal definition is that some persons assume a "right way" of defining the objectives of education. Clearly, there is no single "right way" of doing this task. Most persons consider learning as the central purpose of education. Surely, learning is a most important educational goal but it is not the sole goal.

Oftentimes, before effective pupil learning can take place, schools must provide children with nutritional food services, dental services, or medical services. Goals and objectives for education are not value free. In fact, the basic educational goals and objectives finally adopted would represent the value judgements of those persons who participated in such decisions. In this light, there is no perfect model which would encompass all those goals and objectives the public and school officials have set their hearts on. Surely, schools cannot accomplish, in the time framework of one or even several years, many of the goals and objectives so often eloquently stated in school brochures. Schools do not have the resources to do all things instantaneously. Consequently, in defining objectives, answers need to be obtained to such questions as: What educational services need doing? For whom should these educational services be performed? Why is each educational activity currently being performed? What resources should be allocated to each educational activity? Can some educational activities be better achieved in another way? Are there any educational services currently being performed that should be eliminated? Are there some educational services currently not being performed that should be? Answers to these questions are not easily formulated since they require value judgements be made.

Another problem associated with the development of a district's educational goals and objectives is the tendency to adopt those goals which can easily be quantified, measured,

and evaluated. School officials should not confuse goals with objectives. Goals should be viewed as broad, general statements; objectives are percise, quantifiable, measurable statements subject to rigorous evaluation.

While many more problems associated with defining education's goals and objectives could be presented, a sufficient number have been discussed to serve as illustrations of the problems school officials must face. Yet, unless this task is accomplished, to talk of a sound, practical policy for financing education is naive.

EDUCATIONAL PROGRAM COSTS RE FINANCING EDUCATION

Once education's goals and objectives have been enumerated and promulgated for all to see and understand, there still remain the problems associated with determining educational program costs. Viewed in this light budgets are not documents for the recording of school expenses. They are the financial plans through which men hope to accomplish their worldly dreams. Budgets express man's willingness in dollars to educate youth to attain their worldly dreams.

Not only is it difficult to obtain consensus on education's goals and objectives, but it is also almost as difficult to develop a system to determine educational costs to secure these goals and performance objectives. Consequently, any policy at the state and federal levels dealing with

the financing of education must be grounded in reasonable, reliable, and valid program costs. Unless program costs are known and continuously kept up to date, neither the state nor federal governments will know whether or not monies are equitably distributed to local school districts. Surely, a sound policy for financing education must eliminate to a reasonable degree not only inequities concerned with the tax burdens but also inequities concerned with funding educational program costs.

To obtain program costs requires a budget and expenditure schema. Program Budgeting[1] represents a step in the direction of getting valid educational program costs. Program Budgeting seeks to measure performance in the attainment of school district goals and objectives and to hold those responsible accountable.

The determination of educational program costs at the local school district level leaves much to be desired. Even after such costs are determined they must be continuously updated. Yet a sound policy for financing education must allow for the distribution of state and federal funds on an educational program cost basis.

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1 See Orlando F. Furno, George J. Collins, and George B. Brain, Planning Programming Budgeting Systems -- A Practical Approach (Baltimore, 1972).

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EQUALIZATION OF TAX BURDENS RE FINANCING EDUCATION

Not only must a policy for financing education be rooted in (1) educational goals and performance objectives and (2) educational program costs, but also in equalizing the tax burden on all to support education. In effect, the recent court cases on financing public education have dealt principally with this problem of tax burden equalization. The courts have not defined education's goals and objectives nor have they indicated what the costs should be to achieve education's goals and objectives (i.e., program costs). As indicated earlier, the courts have emphatically emphasized that funds for education of a child depends upon the wealth of the district in which the child resides. In fact, of the three elements enumerated so far with respect to a policy for financing education, the easiest one to attain is equalization of tax burden. One way of doing this is to abolish all school districts in the state and operate all schools as a state system of schools (i.e., one school district). Whereas this would equalize tax burdens for education at acceptable tolerances, it would do nothing or very little to resolve what education should accomplish and how much it would cost in each school to accomplish.

EQUALIZATION OF EDUCATIONAL OPPORTUNITIES

RE FINANCING EDUCATION

A sound policy for financing education must not only be concerned with (1) educational goals and objectives, (2) educational program costs, and (3) equalization of tax burdens, but also with (4) equalization of educational opportunities. Educational opportunities cannot be equalized within acceptable tolerance bands unless goals and objectives are enumerated, program costs determined, and tax burdens equalized. Most persons have a pretty good idea of what they believe equalization of educational opportunities entails. To achieve this is no simple task, since costs in different schools and areas can be widely divergent. For example, the cost of conducting an advanced physics class for three students in a rural school would be entirely different than for thirty students in an urban school. Strict adherence to the principle of equalization of educational opportunities would require that students in the rural school have the same opportunity to take physics as those in the urban school, even though the costs would be ten times greater on a per pupil basis. Suppose to conduct the physics class resulted in cost differentials of twenty, thirty, or forty times? Clearly, there is a cost differential at which the state should be able to suspend strict adherence to the principle of equalization of educational opportunities. What this should be would depend upon a number of complex variables, terrain,

geography, road conditions, population density, etc. Nevertheless, sound fiscal policy for financing education must entail adherence to the principles of equalization of educational opportunities. Like any other principles, it must be tempered by balanced judgements which take into account other principles such as adaptability, stability, flexibility, liberty and license, prudence, economy, structural democracy, and simplicity.

PURSUIT OF JUSTICE AND FISCAL NEUTRALITY RE FINANCING EDUCATION

Concern for individual dignity has always been a touchstone rooted in our nation's moral heritage. Though the greatness of a nation can be manifested in its ideals, moral responsibilities, cultural commitments, and scientific discoveries, such greatness emanates from its individual citizens. Thus, a society's eminence or lack of eminence depends on individual achievements. What will make a nation great in the future is not truly known today.

It is important, then, that the state pursue the goal of quality education in a context of concern for all its people. Too often, private citizens, state legislatures, Congress, and the Supreme Court have not pursued the principle of fiscal neutrality in the context of justice for all. Talent has been inadequately used. Underprivileged minorities are discriminated against educationally, socially, and legally.

Talents of educated, intelligent, and dedicated women are misused or not used at all. Contributions of still vigorous but older workers are wasted. Students in the private sector of ecucation are discriminated against financially; also in some instances students in the public sector of education are discriminated against financially. Since a nation cannot achieve greatness without an excellent educational system, the pursuit of fiscal neutrality in a context of justice for all is a goal that must be striven for in a policy for financing education. All pupils, regardless of race, creed, religion, or ethnic background, must have equality of access to quality education programs without being discriminated against by local, state, or federal governments because they are enrolled in either public or private schools.

CHAPTER 5

RESEARCH DESIGN ON THE DISEQUALIZING EFFECTS OF EXPENDITURE LEVELS UPON SCHOOL QUALITY

In the States that have currently altered their methods of distributing funds to local districts, the emphasis has focused principally upon reducing the disparity among school districts in spending per pupil, in equalizing tax effort, and in guaranteeing equal funds for equal tax rates. The assumption behind this reasoning lies in the cost-quality relationship.[1] Although much evidence exists showing the disparity between wealth and expenditure level, little evidence exists to illustrate the quantitative and qualitative differences on school quality which accompany a given change in expenditure level (spending per pupil), for example, the effects of a $100 per pupil change. This was the object of the research reported herein.

SAMPLE SELECTION

Although a sample of school districts could have been utilized, all the school districts in a large, relatively

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1 See William S. Vincent, John W. Polley, and Orlando F. Furno, Does Money Make a Difference?, Institute of Administrative Research, Teachers College, Columbia University, 1958.
Lorne H. Woollatt, The Cost-Quality Relationship on the Growing Edge, Metropolitan School Study Council, Teachers College, Columbia University, 1949.

wealthy Northeastern State (New York) were used. The State contained over 700 local school districts of which 705 were used in this study. The districts varied in pupil population from less than 100 pupils to more than one million and in area from less than one square mile to several hundred.

DATA COLLECTION - QUALITY RELATED VARIABLES

Data were collected on each of 705 school districts for the 1975-76 school year. Although all of the findings reported herein were based on the 1975-76 school year data, iteration of various statistical tests on 1976-77 school year data indicated that the findings based on the 1975-76 data were applicable to the 1976-77 data. These variables were grouped in terms of several broad categories involving revenue, expenditures, staff training, pupil-staff ratios, and pupil test data.

THE RESEARCH DESIGN AND STATISTICAL ANALYSES

The research design selected was a simple one. The districts were sequenced in accordance with a criterion variable. Then districts in the lowest decile were segregated as were those in the highest decile. Median values on some 90 school quality related variables were computed for those districts in the lowest decile and compared to the median values for those districts in the highest decile. The

critical ratio test for median values was used to test the significance of the differences in median values between the lowest decile districts and the highest decile districts.

The critical ratio test[1] used was:

$$t = (Md_1 - Md_2) / (\sigma_{Md_1}^2 + \sigma_{Md_2}^2)^{1/2}$$

$$\text{where } \sigma_{Md} = 1.2533\,\sigma / (N-1)^{1/2}$$

Four dependent variables were used for sequencing to obtain the lowest and highest decile districts (1) expenditure level; (2) wealth; (3) tax rate; and (4) pupil enrollment. The research design, however, provided for separating districts by various expenditure level groupings and applying critical ratio "t" tests to median differences for the various quality related variables studied and for separating districts by various wealth groupings and applying critical ratio "t" tests to median differences for the same quality related variables.

Although zero order correlations, multiple order correlations, partial order correlations, and part order partial correlations were computed, the results were not reported herein. The object of the research design selected herein was to focus on only the simplest statistical analysis of the data. For this reason, only the reliability of the difference between median values of quality related variables was selected for the fourteen groupings and lowest and highest decile groupings.

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[1]Henry E. Garrett, Statistics in Psychology and Education, Longmans Green and Co., New York, 1951.

CHAPTER 6

THE STATISTICAL RESULTS AND THEIR SIGNIFICANCE OF THE EFFECTS OF EXPENDITURE LEVELS UPON SCHOOL QUALITY RELATED MEASURES

Table 1 contains the results of the critical ratio "t" tests for the lowest and highest decile districts ordered by expenditure level. Table 2 contains similar results except the districts were ordered by wealth rather than expenditure level.

COMPARISONS BETWEEN HIGH AND LOW EXPENDITURE LEVEL DISTRICTS INRE SCHOOL QUALITY RELATED VARIABLES

Consider some important keys to quality education -- two of them, instruction and administration are the heart of any school system. These two items not only account for the greater part of a district's school expenditures, but they also directly affect what is being taught and how well it's taught. Four important keys to a quality education are:[1]

1. The Instructional Staff - particularly the classroom teacher - in terms of salary level, teaching load, degree status, experience.

2. The Administration - both at central level (i.e. the superintendent's staff) and at the building levels (i.e. the principal's staff - in terms of salary level and work load).

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[1]Paul R. Mort, et. al., Public School Finance, McGraw-Hill Book Company, New York, 1960, page 238.

TABLE 1

MEDIAN, STANDARD ERROR OF THE MEDIAN, AND CRITICAL RATIO (T-TEST) COMPARISONS OF SELECTED VARIABLES FOR NEW YORK STATE SCHOOL DISTRICTS ORDERED BY EXPENDITURE LEVEL, 1975-76 SCHOOL YEAR

VARIABLE		FIRST DECILE			TENTH DECILE			CRITICAL RATIO
No.	Name	Median Value	Cases	Std. Error of Median	Median Value	Cases	Std. Error of Median	(T - Test)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		EXPENDITURE VARIABLE						
001	Expenditure Level	1148	70	8.64	2538	71	67.84	20.33a
006	Total Exp Instr Svces/TAPU	879.87	70	12.36	1843	71	107.59	8.89a
007	Total Exp Instr Mat & Sup/TAPU	70.11	70	2.91	79.92	71	8.75	1.06
008	Total Exp Textbooks/TAPU	10.43	70	0.33	13.87	71	1.22	2.72a
		WEALTH, STATE AID, REVENUE VARIABLES						
009	1975 FV/1975-76 RWADA	27272	70	1299	98841	71	13986	5.09a
010	True Tax Rate All Educ Purps	12.70	70	0.50	22.26	71	1.10	7.88a
064	Total State Aid/TAPU	1045	70	16.58	521.68	71	24.79	-17.55a
065	Total Operating Aid/TAPU	901.98	70	13.15	406.37	71	22.98	-18.72a

NOTE: The letters "a" indicates significant difference at the 1% level of significance; "b" at the 2% level of significance; "c" at the 5% level of significance.

TABLE 1 (Continued)

MEDIAN, STANDARD ERROR OF THE MEDIAN, AND CRITICAL RATIO (T-TEST) COMPARISONS OF SELECTED VARIABLES FOR NEW YORK STATE SCHOOL DISTRICTS ORDERED BY EXPENDITURE LEVEL, 1975-76 SCHOOL YEAR

VARIABLE		FIRST DECILE			TENTH DECILE			CRITICAL RATIO
No.	Name	Median Value	Cases	Std. Error of Median	Median Value	Cases	Std. Error of Median	(T - Test)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	TEACHING SALARIES AND STAFFING STANDARDS							
025	Avg Salaries K-6	10299	70	243.61	16832	71	570.11	10.53a
026	Avg Salaries 7-12	11248	70	359.02	18072	71	1128	5.76a
018	Total Prof Staff/WADA	53.62	70	0.74	73.11	71	3.00	6.31a
019	Classroom PK-6/ADA	48.68	70	0.86	62.81	71	2.14	6.13a
020	Classroom 7-12/ADA	55.60	70	1.18	70.52	71	4.91	2.95a
021	Total Classroom/WADA	47.82	70	0.66	62.13	71	2.43	5.68a
022	Other Prof PK-6/ADA	2.66	70	0.42	7.63	71	1.12	4.16a
023	Other Prof 7-12/ADA	5.60	70	0.57	10.68	71	1.16	3.92a
024	Total Other Prof/WADA	5.60	70	0.37	10.52	71	0.97	4.73a
031	Bachelor Degree	48.85	70	1.65	15.69	71	1.60	-14.44a
032	Bachelor +30	21.87	70	1.15	13.83	71	1.36	- 4.51a
033	Master's Degree	23.77	70	1.59	39.41	71	1.67	6.78a
037	Yrs. Teaching in Dist. 50th Percentile	6.00	70	0.19	8.00	71	0.40	4.55a

NOTE: The letters "a" indicates significant difference at the 1% level of significance; "b" at the 2% level of significance; "c" at the 5% level of significance.

TABLE 1 (Continued)

MEDIAN, STANDARD ERROR OF THE MEDIAN, AND CRITICAL RATIO (T-TEST) COMPARISONS OF SELECTED VARIABLES FOR NEW YORK STATE SCHOOL DISTRICTS ORDERED BY EXPENDITURE LEVEL, 1975-76 SCHOOL YEAR

VARIABLE		FIRST DECILE			TENTH DECILE			CRITICAL RATIO
No.	Name	Median Value	Cases	Std. Error of Median	Median Value	Cases	Std. Error of Median	(T - Test)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	PUPIL PERFORMANCE VARIABLES							
042	Pep Median Score Math 3rd Grd	31.95	70	0.71	38.50	71	0.79	6.16a
043	Pep Median Score Math 6th Grd	30.21	70	0.57	34.00	71	0.78	3.91a
044	Pep Median Score Math 9th Grd	40.72	69	0.61	45.50	57	1.21	3.51a
045	Pep Median Score Rdng 3rd Grd	29.30	70	0.71	34.93	71	0.73	5.53a
046	Pep Median Score Rdng 6th Grd	34.82	70	0.35	36.55	71	0.56	2.62b
047	Pep Median Score Rdng 9th Grd	35.30	69	0.30	37.23	57	0.60	2.87a
048	Pep Sto Deviation Math 3rd Grd	11.18	70	0.16	10.78	71	0.15	-1.82
054	Pep % Bel Min Cmp Math 3rd Grd	14.36	70	1.27	7.49	71	1.08	-4.13a
055	Pep % Bel Min Cmp Math 6th Grd	20.39	70	1.10	15.14	71	1.63	-2.67a
056	Pep % Bel Min Cmp Math 9th Grd	24.03	69	1.28	19.79	57	2.14	-1.70
057	Pep % Bel Min Cmp Rdng 3rd Grd	10.23	70	1.29	5.00	71	1.02	-3.18a
058	Pep % Bel Min Cmp Rdng 6th Grd	24.47	70	1.61	18.09	71	1.79	-2.64b
059	Pep % Bel Min Cmp Rdng 9th Grd	28.28	69	1.35	20.00	57	2.41	-3.00a

NOTE: The letters "a" indicates significant difference at the 1% level of significance; "b" at the 2% level of significance; "c" at the 5% level of significance.

TABLE 2

MEDIAN, STANDARD ERROR OF THE MEDIAN, AND CRITICAL RATIO (T-TEST) COMPARISONS OF SELECTED VARIABLES FOR NEW YORK STATE SCHOOL DISTRICTS ORDERED BY 1973 -74 FULL PROPERTY VALUATION/RWADA (AID RATIO WEALTH), 1975-76 SCHOOL YEAR

VARIABLE		FIRST DECILE			TENTH DECILE			CRITICAL RATIO
No.	Name	Median Value	Cases	Std. Error of Median	Median Value	Cases	Std. Error of Median	(T - Test)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		EXPENDITURE VARIABLES						
001	Expenditure Level	1234	70	15.93	2394	71	88.95	12.84a
006	Total Exp Instr Svces/TAPU	920.16	70	12.05	1772	71	129.28	6.56a
007	Total Exp Instr Mat & Sup/TAPU	77.47	70	3.50	89.13	71	7.89	1.35
008	Total Exp Textbooks/TAPU	9.83	70	0.35	13.18	71	1.05	3.03a
		WEALTH, STATE AID, REVENUE VARIABLES						
009	1975 FV/1975-76 RWADA	20927	70	533.33	12978	71	12637	8.60a
010	True Tax Rate All Educ Purps	14.67	70	0.46	14.25	71	0.94	-0.40
064	Total State Aid/TAPU	1177	70	14.37	469.90	71	11.53	-38.40a
065	Total Operating Aid/TAPU	994.52	70	6.62	386.79	71	8.21	-57.64a

NOTE: The letters "a" indicates significant difference at the 1% level of significance; "b" at the 2% level of significance; "c" at the 5% level of significance.

TABLE 2 (Continued)

MEDIAN, STANDARD ERROR OF THE MEDIAN, AND CRITICAL RATIO (T-TEST) COMPARISONS OF SELECTED VARIABLES FOR NEW YORK STATE SCHOOL DISTRICTS ORDERED BY 1973-74 FULL PROPERTY VALUATION/RWADA (AID RATIO WEALTH), 1975-76 SCHOOL YEAR

VARIABLE		FIRST DECILE			TENTH DECILE			CRITICAL RATIO
No.	Name	Median Value	Cases	Std. Error of Median	Median Value	Cases	Std. Error of Median	(T - Test)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	TEACHING SALARIES AND STAFFING STANDARDS							
025	Avg Salaries K-6	10327	70	204.24	15130	71	697.57	6.60a
026	Avg Salaries 7-12	11248	70	314.43	16613	71	999.31	5.12a
018	Total Prof Staff/WADA	57.04	70	0.87	72.48	71	3.07	4.83a
019	Classroom PK-6/ADA	50.52	70	0.91	62.09	71	2.11	554.49a
020	Classroom 7-12/ADA	57.92	70	1.71	70.16	71	4.45	2.56b
021	Total Classroom/WADA	50.42	70	0.77	62.13	71	2.45	4.55a
022	Other Prof PK-6/ADA	3.12	70	0.41	6.12	71	1.14	2.46b
023	Other Prof 7-12/ADA	6.48	70	0.64	9.03	71	1.13	1.95
024	Total Other Prof/WADA	6.30	70	0.34	9.71	71	1.02	3.16a
031	Bachelor Degree	45.66	70	1.56	23.80	71	1.98	- 8.66a
032	Bachelor +30	21.06	70	1.33	17.34	71	1.53	- 1.83
033	Master's Degree	24.76	70	1.44	37.50	71	1.74	5.64a
037	Yrs Teaching In Dist 50th Percentile	6.50	70	0.24	8.00	71	0.33	3.68a

NOTE: The letters "a" indicates significant difference at the 1% level of significance; "b" at the 2% level of significance; "c" at the 5% level of significance.

TABLE 2 (Continued)

MEDIAN, STANDARD ERROR OF THE MEDIAN, AND CRITICAL RATIO (T-TEST) COMPARISONS OF SELECTED VARIABLES FOR NEW YORK STATE SCHOOL DISTRICTS ORDERED BY 1973-74 FULL PROPERTY VALUATION/RWADA (AID RATIO WEALTH), 1975-76 SCHOOL YEAR

VARIABLE		FIRST DECILE			TENTH DECILE			CRITICAL RATIO
No.	Name	Median Value	Cases	Std. Error of Median	Median Value	Cases	Std. Error of Median	(T - Test)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	PUPIL PERFORMANCE VARIABLES							
042	Pep Median Score Math 3rd Grd	31.81	70	0.65	37.83	71	0.87	5.52a
043	Pep Median Score Math 6th Grd	29.04	70	0.47	33.00	71	0.78	4.34a
044	Pep Median Score Math 9th Grd	39.08	70	0.61	43.50	59	1.05	3.62a
045	Pep Median Score Rdng 3rd Grd	28.68	70	0.72	34.50	71	0.81	5.37a
046	Pep Median Score Rdng 6th Grd	32.96	70	0.37	35.81	71	0.57	4.17a
047	Pep Median Score Rdng 9th Grd	35.18	70	0.32	36.33	59	0.56	1.77
048	Pep Std Deviation Math 3rd Grd	11.33	70	0.16	10.79	71	0.19	- 2.20c
054	Pep % Bel Min Comp Math 3rd Grd	16.85	70	1.45	8.29	71	1.22	- 4.52a
055	Pep % Bel Min Comp Math 6th Grd	24.17	70	1.02	17.14	71	1.72	- 3.52a
056	Pep % Bel Min Comp Math 9th Grd	25.45	70	1.33	22.63	59	1.99	- 1.17
057	Pep % Bel Min Comp Rdng 3rd Grd	10.65	70	1.25	5.00	71	1.02	- 3.50a
058	Pep % Bel Min Comp Rdng 6th Grd	27.23	70	1.38	19.47	71	1.82	- 3.40a
059	Pep % Bel Min Comp Rdng 9th Grd	29.82	70	1.38	21.43	59	2.08	- 3.36a

NOTE: The letters "a" indicates significant difference at the 1% level of significance; "b" at the 2% level of significance; "c" at the 5% level of significance.

3. Teaching Materials - including the amount available, their condition, and their up-to-dateness.

4. Clerical and Secretarial Aid - to both administrative and instructional staffs.

Expenditures for these elements must be considered together.

Table 1 has ordered a number of quality related variables by expenditure level for the lowest and uppermost deciles. Median values, standard error of the median, number of cases, and the critical ratios (t'test) for the difference of median are shown.

One way to measure inequalities of educational opportunities is to analyze differences on a number of measures related to school quality between high expenditure and low expenditure districts. Inequalities of educational opportunities cannot be proved or disproved on the basis of conclusions derived from one or two measures. Should measure after measure after measure, however, be significantly in favor of high rather than low expenditure school districts the weight of evidence would seem to point out that inequalities of educational opportunities do exist. Studies already quoted substantiated the deleterious effects of low expenditures upon school quality. For example, this year's policies as they affect teacher employment will leave measureable effects for years to come upon a school district's educational program. The conclusion that flowed from these studies is that state policy with respect to expenditure level today and next year will set its mark on schools for better or for worse for several decades. This factor alone is justification for

the state's profound concern for State and local policies regarding expenditure level.

The Disequalizing Effects of Expenditure Level Upon School Quality Related Expenditures Per Pupil

High expenditure districts (tenth decile) spent $2,538 per pupil and low expenditure districts (first decile) $1,148 -- a difference of $1,390 per pupil. High expenditure districts spent 2.2 times more than low expenditure districts. This difference is highly significant. Such an expenditure level difference can be translated into more funds for instructional services, textbooks, library books, materials and supplies, number of classroom teachers, salaries, teaching experience, and educational training, in high compared to low expenditure districts. For example, high expenditure districts spent $964 per pupil more for Instructional Services, $10 per pupil more for Instructional Materials and Supplies, and $3.44 per pupil more for Textbooks than low expenditure districts -- such differences all being significant at the .01 level of significance.

The Disequalizing Effects of Expenditure Level Inre to Wealth, Revenue, and State Aid

As would be expected high expenditure districts are considerably wealthier than low ones -- 3.62 times wealthier. High expenditure districts (tenth decile) have a median wealth of $98,841 per pupil, compared to $27,272 for

low expenditure districts (first decile).

With respect to tax rates or local effort to support education, low expenditure districts had a median true tax rate for all educational purposes of $12.70 per $1,000 of full property valuation compared to $22.26 for high expenditure districts - a rate only 57 percent as high. However, low expenditure districts must make a higher local effort to support their pupil transportation program and their debt service program than high expenditure districts -- $1.12 true tax rate compared to $0.37 for pupil transportation, and $1.28 true tax rate compared to $1.19 for debt service. Low expenditure districts in New York State do not levy as high a true tax rate for all general fund purposes as do high expenditure districts. Low expenditure districts (first decile) levied a true tax rate of $10.05 compared to $20.34 for high expenditure districts (tenth decile) -- a rate only 49 percent as high. Interestingly, applying these median tax rates to the median full property values of the low and high expenditure districts yields $288 per pupil enrolled for low expenditure districts and $2,299 per pupil enrolled for the high expenditure districts. State aid to low expenditure districts averages $1,003 per pupil for general operating expenses and for high expenditure districts $501 per pupil. Totalling state aid and locally raised taxes yields for low expenditure districts $1,291 per pupil for general operating expenses and $2,800 per pupil for high expenditure districts. Thus, on average, the local-state

relationship for funding general operating expenses in the school districts of New York has created a difference of $1,509 per pupil between low and high expenditure districts. Does this difference imply that inequalities in educational opportunities occurred between low and high expenditure districts? Perhaps an analysis of differences in staff adequacy, salaries of teachers, teacher experience, and pupil test results should shed light on this question.

The Disequalizing Effects of Expenditure Level Inre to Teacher Characteristics

Low expenditure districts (first decile) employed on the average 53.62 professional staff members per 1,000 pupils (WADA).[1] High expenditure level districts (tenth decile) employ 73.11 professional staff members per 1,000 pupils -- 1.4 times as many as low expenditure districts. An analysis of staffing ratios can reveal insights into state and local policies with respect to such concerns as class size at elementary versus secondary levels, apportionment of staff between elementary and secondary instructional programs, and the relationship between staff adequacy and salaries.

Low expenditure districts employ 48.68 classroom

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1 Weighted average daily attendance pupil unit is defined as: This is determined by applying the following weightings to the average daily attendance: half-day kindergarten, 0.50; full-day kindergarten and grades one through six, 1.00; grades seven through 12, 1.25. For aid purposes the higher of 3-year average (base year and two previous years) or the base year WADA.

teachers per 1,000 pupils (EADA)[1] compared to 55.60 classroom teachers per 1,000 pupils (secondary average daily attendance, SADA).[2] On the other hand, high expenditure districts engage 62.81 classroom teachers per 1,000 pupils (EADA) and 70.52 at the secondary level (Grades 7-12).

Whether districts possess high or low expenditure levels, they invariably allocate more classroom teachers per 1,000 pupils to secondary rather than elementary programs. Yet there is a great difference between high expenditure districts diverting more staff into secondary rather than elementary programs and low expenditure districts doing so. For example, as previously indicated low expenditure districts employ 48.68 classroom teachers per 1,000 pupils (EADA) but high expenditure districts engage 62.81 -- 14.13 more classroom teachers per 1,000 pupils. While staffing adequacy cannot be translated precisely into class size statistics, nevertheless, the measure's inverse yields valuable clues concerning class size statistics. In the low expenditure districts pupils per classroom teacher for elementary school programs are around 21 pupils per teacher but in high expenditure districts, 16 pupils per teacher; for secondary schools, the pupil-teacher comparisons are 18 pupils per teacher for low expenditure districts and 14 for

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1 Elementary average daily attendance covers pupils in pre-kindergarten, kindergarten (halfday and full day), and Grades 1 to 6 educational programs inclusive.

2 Secondary average daily attendance covers pupils in Grades 7 to 12 educational programs inclusive and are unweighted.

high ones.

With respect to professional staff members other than classroom teachers, school districts have opted to employ higher ratios at the secondary rather than the elementary level -- in fact, low expenditure schools (first decile) employ 2.1 times as many and high expenditure schools 1.4 times as many. The reason the staffing ratios between elementary and secondary schools differ less for the high expenditure districts than for the low expenditure schools is the rich staffing ratios that already exist in the high expenditure secondary schools. For example, high expenditure districts engage 10.68 nonclassroom professional staff members per 1,000 pupils in secondary schools compared to 5.60 in low expenditure schools -- almost twice as many. At the elementary level, the statistics are similar. High expenditure districts have staffing ratios of 7.63 compared to 2.66 for low expenditure ones -- almost three times more. Clearly, low expenditure districts are forced for whatever reasons to staff their secondary schools at the expense of their elementary schools.

Not only do the high expenditure school districts have richer staffing ratios at both the classroom teacher and supporting professional staff levels but they also pay higher salaries. High expenditure districts pay their elementary staff on the average salaries of $16,832 compared to $10,299 for low expenditure districts. At the secondary level, the statistics are $18,072 compared to $11,248.

Salaries manifest themselves into several important measures -- degree status, years of teaching experience, and maturity of the staff. All three of these measures were highly correlated with adaptability[1] as measured by The Growing Edge school quality instrument.

Salary levels in New York State school districts were not so low as to result in measurable numbers of teachers being employed with no bachelor's degree. This could be more a function of supply and demand than salary levels. In the main, in New York State there is an oversupply of teachers at the very time that most school districts are decreasing or remaining constant in pupil enrollments. Thus, school districts in New York State are in a position to employ degree status teachers regardless of salary attraction. Low expenditure districts do employ larger numbers of persons with bachelor degrees and bachelor degrees plus 30 hours of additional academic training than do high expenditure districts -- for bachelor degrees, 48.85 compared to 15.69 percent; and for bachelor degree plus 30 hours, 21.87 compared to 13.83 percent. However, the high expenditure schools hire 39.41 percent of professional employees with masters degree compared to 23.77 percent for low expenditures districts. The comparative statistics for masters degree

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1 See Donald H. Ross, Administration for Adaptability, Teacher's College, Columbia University, New York. Also see Paul R. Mort, Educational Adaptability, Metropolitan School Study Council, Teacher's College, Columbia University, New York, 1954.

plus 30 hours of additional training are 25.24 to 3.84 percent.

Summarizing the teacher characteristic measures reflects the facts that high expenditure districts compared to low expenditure districts have significantly higher professional staff ratios both at the elementary and secondary levels, probably have lower class sizes, pay significantly higher salaries, have better trained teachers, experience less teacher turnover, and possess more mature staffs.

Quality in a school staff is a conscious effort of policies pursued over a long span of time. The effects of expenditure level cast a long shadow over the excellence of the school staff. Policies should be geared to the consistent recruitment of able teachers. For excellence in teaching requires exacting qualifications of character, personality, ability, and preparation. As the Educational Policies Commission[1] stated "More is expected of the teacher than imparting knowledge and skills." The quality of a school staff not only depends on the individual characteristics just stated but also on its size and composition. Decisions on these two measures determine in large part size of classes and amount and type of educational services which can be rendered. Because of differentiated approaches to

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[1] Educational Policies Commission, An Essay on Quality in Public Education, National Education Association of the United States, Washington, D.C., 1959.

teaching, staff size is equally as important as class size. Students with hostile learning attitudes, marked social and emotional problems, academic or physical handicaps require specialized services. Librarians, guidance specialists, psychologists, reading specialists, and other curriculum specialists are needed to make learning for these pupils more productive and meaningful. Creative teaching, however, requires freedom -- freedom to inquire, experiment, and innovate. To recruit and retain outstanding personnel, state-local fiscal policies must provide staff with opportunities for professional growth and personal freedom all other citizens enjoy. When such conditions, particularly salaries, vary greatly among school districts, teachers tend to gravitate toward those districts which pay higher salaries, offer better teaching and working conditions, and possess faster rates of salary advancements. State-local fiscal policies which create an environment for "playing musical chairs with staff size, composition, and salaries for teachers" breed inequalities of educational opportunities.

The Disequalizing Effects of Wealth Inre To Pupil Performance Measures

Some educators would argue that expenditure level, salaries, class size, and teacher characteristics are only surrogate measures and are not greatly indicative of school excellence. Standards of judging quality education should be based upon pupil performance. Over the years Americans have

not thought too clearly about excellence. Equality of educational opportunity has often been placed in a tug of war with excellence. No doubt education must encourage excellence in individual performance. But it must also strive to emphasize equality of educational opportunity. Not only must equal educational opportunity preserve the freedom of the pupil to excel; it must also recognize pupil differences in intellect and motivation; it must provide for differences in pupil achievement. The Rockefeller Report on the Pursuit of Excellence[1] stressed that excellence in achievement was a product of ability and motivation. That Americans must recognize that differences in pupil talent and ability should not be made into judgements of differences in human worth and dignity.

Mort[2] in a discussion of the learner and the learning process maintained "that which intelligence tests measure is mutuable." Mort continued "there is no point in getting into a conflict as to whether or not intelligence tests measure anything innate or simply measure acculturation." The point remains that there is a significant relationship between results on intelligence tests and success in pupil

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1 The Rockefeller Report on Education, The Pursuit of Excellence Education and the Future of America, Special Studies Project Report V, Doubleday Co., New York, 1958.

2 Paul R. Mort, Director, Toward More Quality Education, New York State Educational Conference Board, Albany, 1958.

learning. Presumably, then a good school environment can be expected not only to teach specifics but to "make the children smarter" in general.

Pupil achievement test scores are a measure of a school's educational output. But they are not the only measures. Moreover, the data presented on pupil achievement in reading and arithmetic should be tempered by differences in innate pupil ability and in the overall atmosphere of the pupil's home. Such measures were not available to ameliorate pupil test achievement test scores. The Fleischmann Report[1] declared that "studies of school performance show a significant and consistent correlation between test scores or class rank and socioeconomic status." The Report continued that "Equality of educational opportunity does not exist for students in New York State." Is this true? Will pupil achievement scores substantiate this statement? Analyses of test score results in high and low expenditure districts could shed some light on this question.

New York State administers under its Pupil Evaluation Program (PEP) standardized tests in reading and mathematics. These tests are given to pupils in Grades 3, 6, and 9 in each school in New York State. Pupils scored lower in reading and arithmetic in low expenditure districts (first decile) than did pupils in high expenditure districts (tenth

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1 Manly Fleischmann, Chairman, Report of the New York State Commission on the Quality, Cost, and Financing of Elementary and Secondary Education, the State Education Department, Albany, New York, 1972.

decile). Moreover, low expenditure districts had significantly greater percents of pupils below minimum competency standards[1] in arithmetic and reading than did pupils in high expenditure schools. For example, in low expenditure schools, 14.36 percent of the pupils on average were below minimum competency in mathematics at Grade 3 compared to 7.49 percent in high expenditure districts; at the sixth grade level the corresponding comparative statistics were 20.39 to 15.14 percent; and at the ninth grade level, 24.03 to 19.79 percent. With respect to reading, a similar picture emerges. More pupils in low compared to those in high expenditure districts scored below minimum competency in reading: 10.23 to 5.00 percent in grade 3; 24.47 to 18.09 percent in grade 6; and 28.28 to 20.00 percent in grade 9.

As indicated at the outset, no allowance was made for innate pupil ability nor for socioeconomic statistics. The Fleischmann Report[2] indicated that "58 percent of the variance in student achievement to be predicted by the three factors of (1) broken homes, (2) overcrowded housing, and (3) education of the head of household." This still would leave a considerable amount of the variance in pupil test

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1 In the Pupil Evaluation Program (PEP) in New York State, a minimum competency standard is defined as pupils who have scored under their most recent acceptable test two grade levels below the norm for the grade level in which such pupils were enrolled in reading or arithmetic.

2 Manly Fleischmann, Chairman, Report of the New York State Commission on the Quality, Cost, and Financing of Elementary and Secondary Education, the State Education Department, Albany, New York, 1972.

scores to be explained by other factors.

COMPARISONS BETWEEN HIGH AND LOW WEALTH DISTRICTS INRE SCHOOL QUALITY RELATED VARIABLES

The previous section discussed differences in a number of variables related to school quality in terms of high and low expenditure level districts. This section compares differences in a number of school quality related variables in terms of low and high wealth districts. Table 2 contains a comparison of high and low wealth on variations in school quality related variables.

The Disequalizing Effects of Wealth Upon School Quality Related Expenditures Per Pupil

Previously, several studies were cited concerning the relationship between per pupil expenditures and school quality. This section examines the part that wealth plays in creating differences in quality related measures. Low wealth districts (first decile) spend $1,234 per pupil compared to $2,394 per pupil for high wealth districts. The difference is highly significant. State aid distribution formulas have not compensated for differences in school district wealth. This violates the principle that the quality of a child's education should not have to depend upon the wealth of the district in which the child resides. This expenditure difference is translated in high expenditure districts as more

monies for instructional services, textbooks, instructional materials and supplies, classroom teachers' salaries, numbers of teachers, teaching experience and educational training. For example, high wealth districts (tenth decile) spend $842 per pupil more for instructional services than do low wealth districts (first decile), $11.66 more per pupil for instructional materials and supplies, and $3.35 more per pupil for textbooks.

The Disequalizing Effects of Wealth Inre to Expenditure Level, Revenue, and State Aid

Local effort may be defined as locally raised revenue per pupil or true tax rates on full property valuations to support current operating expenses. Wealth is defined as full property valuation per resident weighted average daily attendance. High wealth districts (tenth decile) have 6.65 times the wealth that low wealth districts have -- $95,110 per RWADA to $14,307 per RWADA. The difference between upper and lower wealth quartiles is large -- being some 3.80 times greater in the high wealth districts -- $66,961 per RWADA to $17,637 per RWADA.

The lowest decile wealth districts support education at a true tax rate of 14.67 mills compared to 14.25 mills for the highest decile districts. However, when the lowest and highest quartile wealth districts are analyzed, the highest wealth districts levy 18.91 mills to support education compared to 14.97 for the lowest wealth districts --

a 3.94 mill difference significant at more than the one percent level of significance. Because of the present formulas for distributing funds for pupil transportation and debt service payments, low wealth districts must make greater efforts through local tax rates to support the pupil transportation and debt service programs than high wealth districts -- $1.71 true tax rate compared to $0.37 for pupil transportation and $1.62 true tax rate compared to $1.17 for debt service. This probably helps explain why low wealth districts do not levy as high true tax rates for all general fund purposes as do high wealth districts. Low wealth districts (first decile) levied a true tax rate of $9.63 compared to $12.30 for high wealth districts (tenth decile) -- a rate only 78 percent as high.

Applying the aforementioned median to true tax rates to median full property values of the low and high wealth districts yields $214 per pupil for the low wealth districts and $1,477 per pupil for the high wealth districts. State aid to low wealth districts averaged $995 per pupil for general fund operating expenses and for high wealth districts $387 per pupil. Summing state aid and locally raised taxes indicates that low wealth districts would have $1,209 per pupil for general operating expenses and high wealth districts $1,864 per pupil. Thus, on the average, the local-state relationship for funding general operating expenses in New York State school districts has created a difference of some $655 per pupil between high and low wealth districts. The

question that requires a response is: does this difference create inequalities in educational opportunities in school districts between low and high wealth districts? An analysis of differences between low and high wealth districts in terms of staff adequacy, teacher salaries, teacher experience and education, and pupil test results should shed light on this question.

The Disequalizing Effects of Wealth Inre to Staff Salaries and Teacher Characteristics

Low wealth districts (first decile) employ 57.04 staff members per 1,000 pupils compared to 72.48 for high wealth districts -- a difference of 15.44 professional staff members per 1,000 students. This difference is significant at the one percent level of significance. An analysis of staffing ratio differences reveals insights into state and local policies with respect to staffing secondary versus elementary schools, class size at elementary versus secondary schools, program extent in secondary schools, and the relationship between staff adequacy and salaries.

Low wealth districts allocate on the average 50.52 classroom teachers per 1,000 (EADA) to elementary schools compared to 57.92 classroom teachers per 1,000 (SADA) for secondary schools. On the other hand high wealth districts allocate 62.09 classroom teachers per 1,000 pupils (elementary average daily attendance, EADA) for elementary schools compared to 70.16 classroom teachers per 1,000 pupils

(secondary average daily attendance, SADA) for secondary schools. Whether districts possess high or low wealth levels, they invariably allocate more staff to secondary rather than elementary schools programs. Clearly, the effect on the elementary school program is greater in the low than in the high wealth districts. For example, high wealth districts employ 15.44 more staff per 1,000 pupils than do low wealth districts. Diverting more staff into the secondary schools, still leaves high wealth districts with considerably more staff at the elementary school levels than low wealth districts have at the secondary level. Granted that staffing ratios cannot be translated precisely into class size statistics, nevertheless, the measure's inverse yields valuable clues concerning class size statistics. In low wealth districts, pupil-teacher ratios for elementary school programs are around 20 pupils per teacher compared to 16 for high wealth districts; for secondary schools the pupil-teacher ratio comparisons are 17 pupils per teacher for low wealth and 14 for high wealth districts.

With respect to professional staff members other than classroom teachers, school districts in New York State have elected to employ higher ratios at the secondary rather than elementary levels -- in reality, low wealth districts employ 2.1 times as many and high wealth districts 1.5 times as many. One reason that high wealth staffing ratios do not differ as greatly between elementary and secondary schools compared to low wealth districts is the rich overall staffing ratios that

already exist in high wealth districts. For example, high wealth districts engage 9.03 nonclassroom professional staff members per 1,000 pupils at the secondary school level compared to 6.48 for low wealth districts -- 1.4 times as many. At the elementary level, high wealth districts employ 6.12 nonclassroom professional staff members per 1,000 pupils compared to 3.12 for low wealth districts -- almost twice as many. Low wealth districts are forced for whatever reasons to staff their secondary schools at the expense of their elementary schools. It appears that New York State's system of financing its public schools does not ameliorate the plight of low wealth districts so that they could offer instructional services for children comparable to high wealth districts.

Not only do high wealth districts have richer staff ratios than low wealth districts in New York State but as might be expected the former districts pay higher staff salaries. High wealth districts (tenth decile) pay their elementary staffs on the average salaries of $15,130 compared to $10,327 for low wealth districts (first decile). At the secondary level, the comparable statistics are $16,613 compared to $11,248.

Salaries manifest themselves into several important determiners of school quality -- degree status, years of teaching experience, and maturity of staff. All three of these measures are positively and significantly correlated with school quality. Clearly, to ascertain the true relation-

ship between pupil test measures and teaching experience, degree status, and teachers age requires partialing out the effects of pupil intelligence and socio-economic social measures.

Teacher salary levels in New York State are not low when compared to teacher salary levels in other states.[1] The distribution of teachers in New York State with respect to degree status is more a function of supply and demand than of low or high salary levels. Few districts, either poor or rich report even negligible numbers of teachers without degrees. At the bachelor's level, however, significantly higher percentages of teachers only with bachelors degrees are found in low compared to high wealth districts -- 45.66 percent to 23.80. This also is true with respect to bachelor degrees plus 30 hours additional academic training -- 21.06 compared to 17.34 percent. At first glance this seems odd. However, the high wealth districts employ 37.50 percent of professional employees with Master's Degree compared to 24.76 percent for low wealth districts. The great discrepancy occurs at the Master's + 30 hours of additional academic training because high wealth districts have 15.94 percent compared to 4.47 percent for low wealth districts.

In summary, the teacher characteristics measures are found to exist in greater quantities in high rather than

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[1] For example, in 1975-76, New York State ranked second out of 50 States in average teachers' salaries.

low wealth districts. High wealth districts compared to low wealth districts have significantly higher teacher salaries, professional staff ratios both at the elementary and secondary school levels, have lower class sizes, have better trained teachers, experience less teacher turnover, and possess more mature staffs. State-local fiscal policies for public education in New York State have not eliminated wealth as a major cause for significant differences in the measures just stated. These differences are surely significant in creating differences in educational programs and instructional techniques. Such differences breed inequalities in educational opportunities available to students in low wealth compared to high wealth districts.

The Disequalizing Effects of Wealth Inre to Pupil Performance Measures

As indicated previously under a similar section discussing per pupil expenditures, some educators as well as economists argue that standards for judging quality education should be based upon pupil performance measures and in particular upon test results.

New York State administers under its Pupil Evaluation Program (PEP) standardized tests in reading and mathematics. These tests are given to pupils in Grades 3, 6, and 9 in each school in New York State. Pupils scored lower in reading and arithmetic in low wealth districts (first decile) than did pupils in high wealth districts (tenth decile). The

differences were significant at more than the one percent level of significance. Moreover, low wealth districts had significantly greater percents of students scoring below minimum competency standards in arithmetic and reading than did high wealth districts. The statistics, for example, are as follows: in low wealth districts, 16.85 percent of the pupils scored below minimum competency in mathematics at Grade 3 compared to 8.29 percent for high wealth districts -- more than twice as many; at the sixth grade level the comparative statistics were 24.17 percent to 17.14 percent -- 1.4 times as many and at Grade 9 the data were 25.45 percent compared to 22.63. With respect to reading a similar picture emerges, in low wealth districts more pupils scored below minimum competency than did the pupils in high wealth districts; 10.65 percent to 5.00 in Grade 3 -- twice as many; 27.23 percent to 19.47 in Grade 6; and 29.82 percent to 21.43 in Grade 9.

Surely, wealth alone is not the responsible, causative agent creating these differences in pupil test measures. Nor should pupil performance be judged solely in terms of paper and pencil tests. Yet in most instances the entrance into most professions is through written tests. High wealth compared to low wealth districts create conditions which foster individualized instruction -- so that "each pupil can learn in his own way and in his own time." Several court decisions[1] have enunciated the principle that a child's

[1] Serrano vs. Priest 5 Cal 3d 584 (August 30, 1971). Robinson vs. Cahill 62 N.J. at 490, 491. (1973)

education should not have to depend upon the wealth of the district in which the child lives. Yet the statistics quoted in this section have evidenced the fact that New York State's methods for financing public education have not eliminated the pernicious effects of school district wealth. In New York State, it appears that the quality of education a child receives does depend upon his place of residence.

Berke[1] writing in Newsday commented about the financial situation in New York State:

"The discrimination is evident in the variation in school spending from under $1,200 per pupil in 218 school districts to over $2,000 per pupil in 81 school districts. The differences in the quality of educational services offered may be inferred from a few key educational indicators: In the 218 lower-spending districts, one out of every three teachers is uncertified, and one out of every three holds a master's degree. By contrast, in the 81 higher-spending districts, only one out of every seven teachers is below minimum certification standards and two out of every three hold a master's degree. Higher-spending districts also provide proportionately more personnel services to their pupils, including guidance counselors, psychologists, librarians and nurses."

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[2] Joel S. Berke, "School Funding: Beastly Problem With Solutions," Newsday, September 26, 1976.

DISEQUALIZING EFFECTS ON SCHOOL QUALITY OF EXPENDITURES AT DIFFERENT COST LEVELS

We previously described the disequalizing effects of State aid formulas upon low expenditures versus high expenditure districts. By means of critical ratio tests, ("t" tests), some 90 school quality related variables were evaluated. This section had as its objective to assess the effects of different levels of per pupil expenditures upon a number of school quality related variables. The assumption was that significant differences in school quality related variables created significant inequalities in educational opportunities for children. For example, the effects of significant expenditure level differences show up in monies expended for instructional services. The funds expended for instructional services manifest themselves into class size, staff ratios, staff salaries, textbooks, library books, and audio-visual materials and equipment -- items extremely important to the teaching and pupil learning processes.

To assess the disequalizing effects of expenditure level required that school districts be grouped in accordance with their expenditure levels. Data from 705 school districts in New York State for the 1975-76 school year were utilized. Three different categorical expenditure level groupings were used: (1) school districts were divided into 7 groups of approximately 100 districts per group; (2) school districts were divided into 14 groups of approximately 50 districts per

group; and (3) school districts were divided into 28 groups of approximately 25 districts per group. Although critical ratios were computed for all quality related variables between each possible pair of expenditure groupings, only those for the 14 groupings were reported herein.

Many studies have documented the disequalizing effects of large wealth and expenditure level differences upon school quality related variables. This research study attempted to engender discussion, shed light upon, and stimulate additional reasearch on such questions as: How large must expenditure levels be before their disequalizing effects upon equality of educational opportunities become evident? Do the disequalizing effects of expenditure levels operate uniformly on most school quality related variables? How large must an expenditure level difference be before its disequalizing effect appears in staffing ratios? In instructional materials and supplies? In quality and quantity of the teaching staff? In pupil test results? In class size differences? Do expenditure level differences at the lower end, middle portion, and upper end of the expenditure level distribution exhibit the same disequalizing effects? In other words, is an expenditure level difference of $200 per pupil more or less critical with respect to school quality related variables at low expenditure levels (less than $1000 per pupil), average expenditure levels ($1500 per pupil), and high expenditure levels (over $2000 per pupil)? If equality of educational opportunities for all children is the primary

goal of a State fiscal plan for public education, in light of the answers to the above posed questions, how effective are such State plans based primarily on district power equalizing formulas, aid ratio formulas, millage (foundation program) formulas, percentage equalizing formulas, and guaranteed yield formulas?

THEORY AND SYNTHESIS OF A SEQUENTIAL SIMPLEX

Presently, it has become fashionable to talk about models in administrative research. A model, of course, refers to a mathematical conceptualization of processes and relationships in an operation or organization. Almost four decades ago, Paul R. Mort conceived of an educational administrative model. He named it the Sequential Simplex.[1] It was a model for assessing the effectiveness of administrative policies on school quality.

The Sequential Simplex Model sought to conceptualize and to define various classes of causative influences upon the quality of education children receive. The model had both a logical basis in reason and a statistical consistency in fact. The vector forces of community (both past and present), staff, administration, legal setting, and operational practices are intertwined like the circuits in a modern day

[1]Paul R. Mort and Orlando F. Furno, Theory and Synthesis of a Sequential Simplex, "A Model for Assessing the Effectiveness of Administrative Policies," Institute of Administrative Research, Teachers College, Columbia University, 1960.

computer but with their relationships only partly identified and measured. Such a model makes it possible not only to evaluate forces functioning over the entire range of policy concerns, but also to ascertain clearer concepts of how individual forces function and interplay with others to produce quality educational programs. Figure 6.1 conceptualizes the model and Figure 6.2 identifies specific measures. It is within such an administrative research model that we have chosen to evaluate the effects of expenditure level upon school quality related variables.

Consider for the moment such measures as wealth, expenditure level, per pupil expenditures for instructional services, professional salaries, per pupil expenditures for textbooks, and per pupil expenditures for instructional materials and supplies. These reside in a series of measures constituting a financial continuum. They represent in terms of the Sequential Simplex Model, financial forces viewed at three different points along the financial continuum. All of these measures are highly intercorrelated. A fact which presumably demonstrates that they are different measures of the same financial forces and/or transformations of them.

THE FLOW OF WEALTH IN EXPENDITURE LEVEL

Expenditure level in the local school district is the resultant of a number of forces such as level of State aid, wealth, property tax rate, and community's willingness

SEQUENTIAL SIMPLEX MODEL B-1955

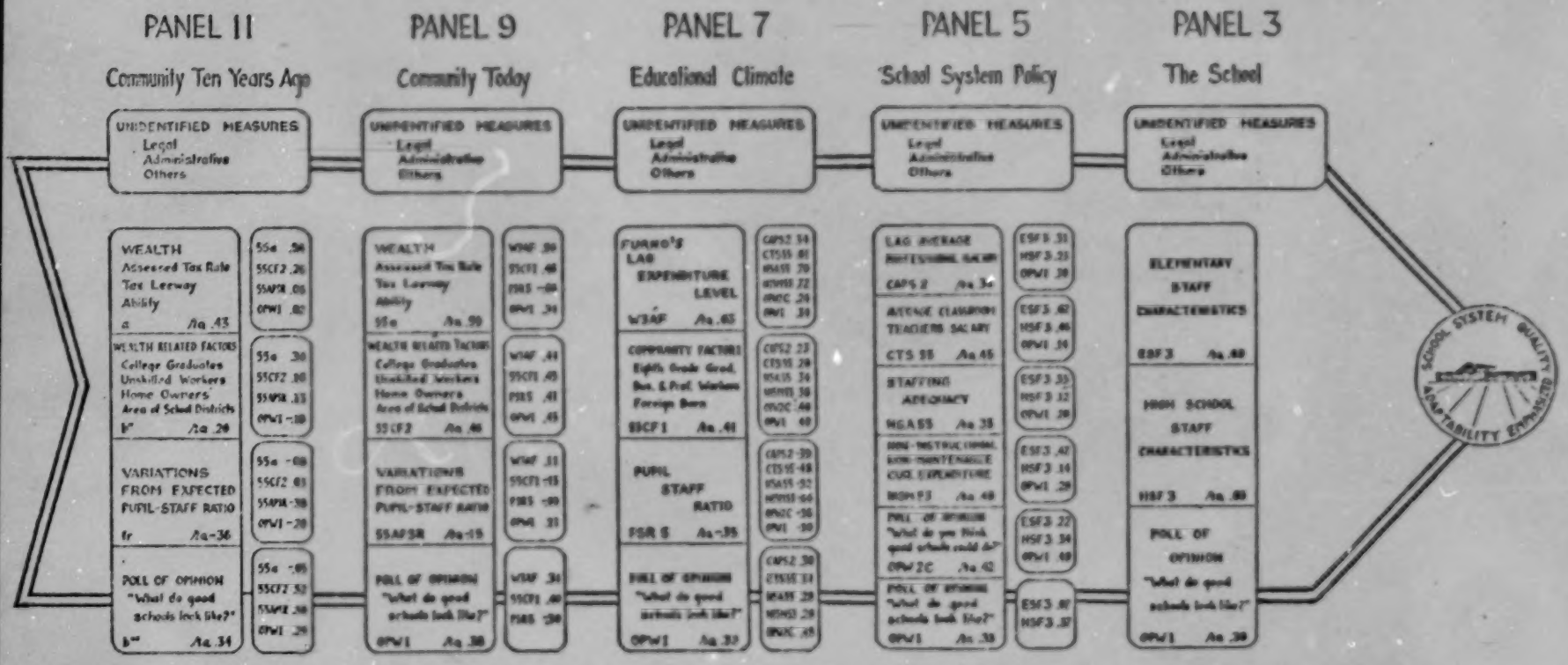

Figure 6.1 The schema for the control model idea of the Sequential Simplex Theory. It should be read as follows: The correlation between Staffing Adequacy, NSA55, and school quality is represented by the symbol rq — .35. The correlation between Staffing Adequacy and the separate measures in Panel 3 is shown in the block to the right of the staffing adequacy measure. For example, the correlation between Staffing Adequacy and Elementary Staff Characteristics, ESF3, is .62.

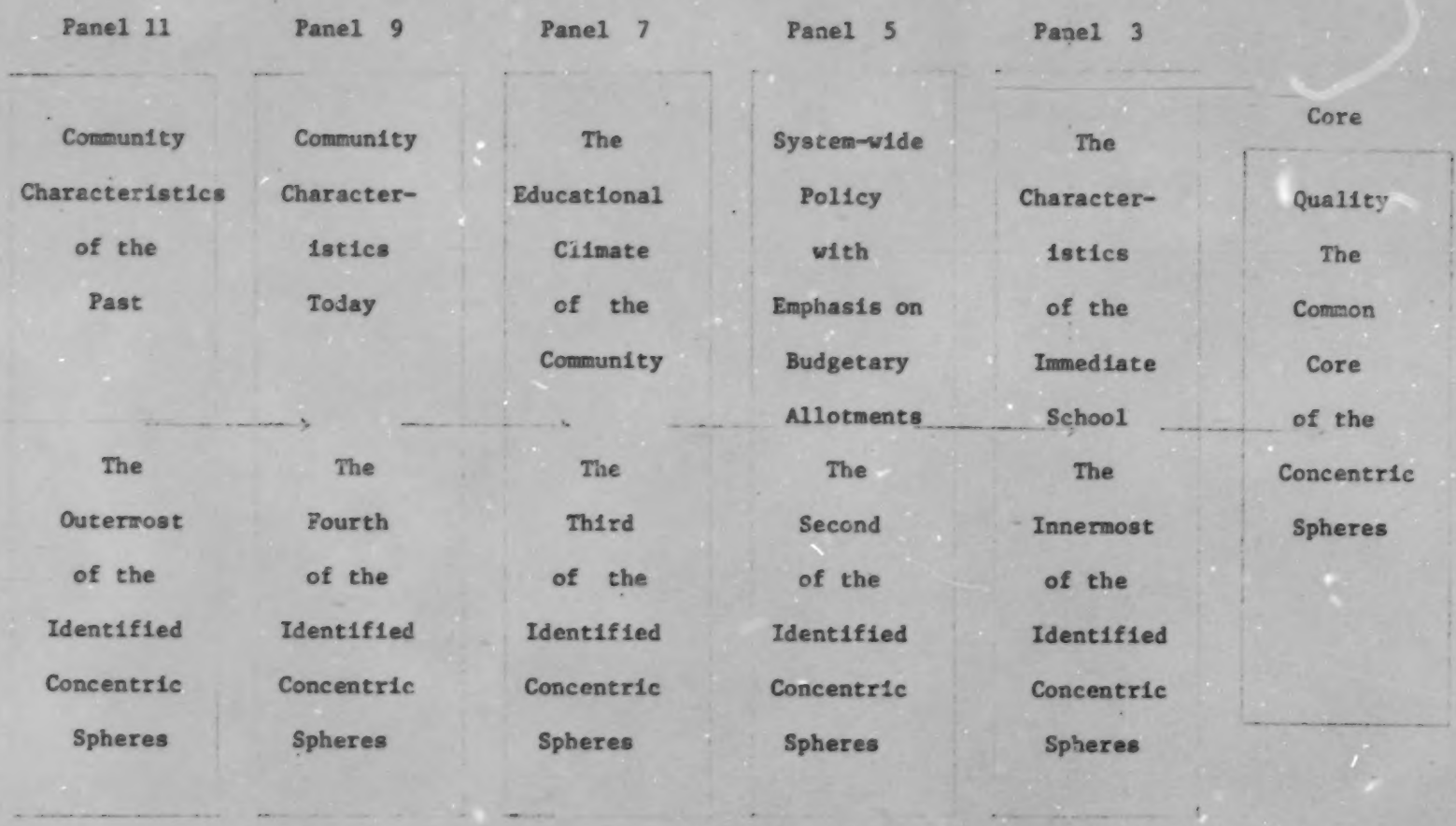
Panel 11
Panel 9
Panel 7
Panel 5
Panel 3
Community Characteristics of the Past
Community Character-istics Today
The Educational Climate of the Community
System-wide Policy with Emphasis on Budgetary Allotments
The Character-istics of the Immediate School
Core Quality The Common Core of the Concentric Spheres
The Outermost of the Identified Concentric Spheres
The Fourth of the Identified Concentric Spheres
The Third of the Identified Concentric Spheres
The Second of the Identified Concentric Spheres
The Innermost of the Identified Concentric Spheres

Figure 6.2. The Concentric Spheres Theory of the Sequential Arrangement of facets of the School and Community that affect school quality.

to support education. All function in a complex mixture of forces to create a flow of money into district expenditure levels.

Figure 6.3 depicts the relationship for true tax rate on equalized property assessments and expenditure level. In the main, as tax rates increase so do expenditure levels. This relationship holds true until per pupil expenditures exceed about $2200. This is because very high per pupil expenditure districts are also very wealthy and, therefore, need not levy unduly high taxes to obtain very high expenditure levels. Of the 91 possible group comparisons concerning true tax rates, 68 were significantly different.

Figure 6.4 shows the relationship between wealth and expenditure level. The relationship is a high and positive one and not convoluted at the uppermost values as is the case with true tax rates. Of the 91 possible group comparisons, 66 were significantly different.

As indicated earlier, expenditure level is the resultant of State and local policy decisions regarding levels of taxation and methods of distribution of funds. As can be seen in Figure 6.5 New York State basically distributes more aid per pupil to low compared to high expenditure districts. For example, districts expending about $2600 per pupil get about $406 per pupil from the State whereas districts spending about $1130 per pupil receive about $902 per pupil. However, New York has over the years distributed its funds in such a way that coupled with local spending

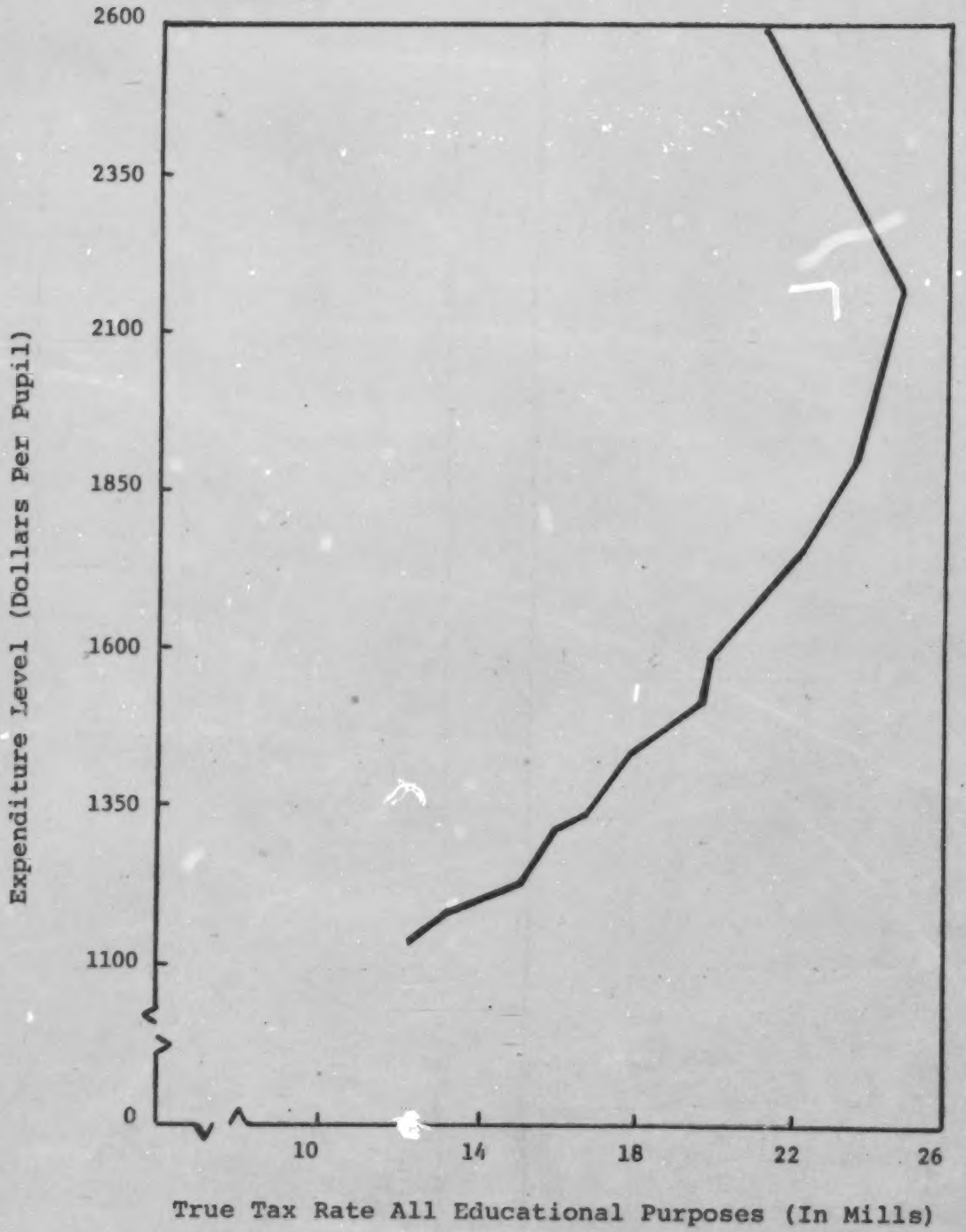
2600
2350
2100
1850
1600
1350
1100
0
Expenditure Level (Dollars Per Pupil)
10
14
18
22
26
True Tax Rate All Educational Purposes (In Mills)

FIGURE 6.3

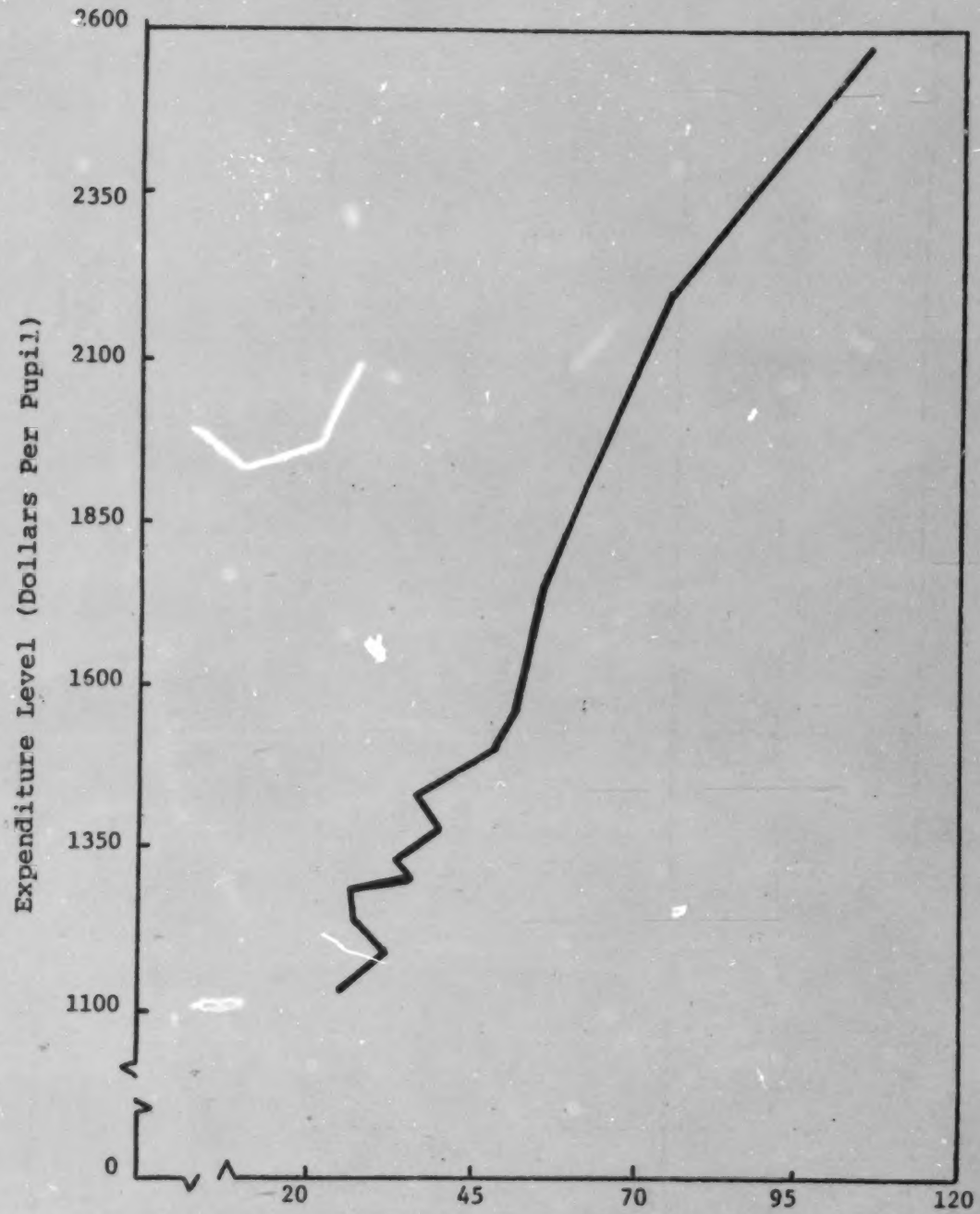
2600
2350
2100
1850
1600
1350
1100
0
Expenditure Level (Dollars Per Pupil)
20
45
70
95
120
Wealth (Full Value Per Pupil),
(In Thousands of Dollars)

FIGURE 6.4

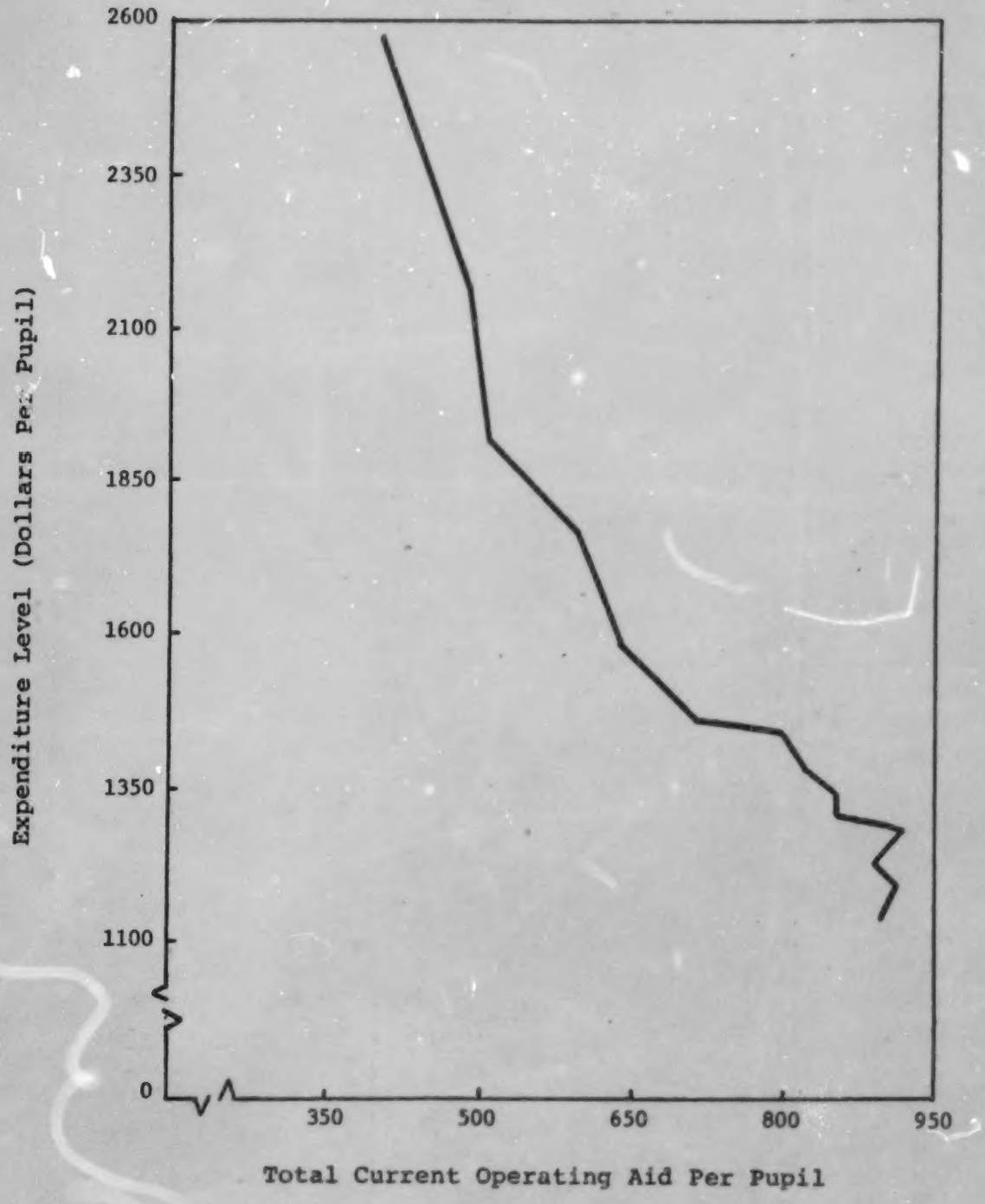
2600
2350
2100
1850
1600
1350
1100
0
Expenditure Level (Dollars Per Pupil)
350
500
650
800
950
Total Current Operating Aid Per Pupil

FIGURE 6.5

options has resulted in an ever-widening expenditure level gap. This is evidenced by Figure 6.6 the expenditure level gap in New York State.

The fourteen expenditure level groups, the median expenditure level in each group, and the number of cases in each group are enumerated in Table 3 for the Sequential Simplex Model. Table 4 contains the absolute cost per pupil difference between the various groups. There were 91 intergroup comparisons for a fourteen group matrix. Of these possible comparisons, all were signficantly different.

Some states in their state fiscal reform policies have discussed as a goal for equality of educational opportunities no expenditure level differences of more than $200 per pupil. Is closure of the expenditure gap to $200 per pupil realistic? Before this question can be answered, another needs to be posed and answered: how do expenditure level differences manifest themselves in school quality related variables?

THE FLOW OF EXPENDITURE LEVEL INTO INSTRUCTIONAL SERVICES

As indicated earlier, the Sequential Simplex Model provides an operational theory for assessing the flow of expenditure level into instructional services. The Sequential Simplex Model also provides a means for computing and evaluating the complex inter-relationships in the matrix comprising the various measures associated with instructional

TABLE 3

SEQUENTIAL SIMPLEX EXPENDITURE LEVEL MODEL SHOWING SCHOOL QUALITY RELATED VARIABLES, MEDIAN PER PUPIL EXPENDITURES, AND NUMBER OF SCHOOL DISTRICTS

FOURTEEN EXPENDITURE LEVEL GROUPINGS		
Group Number (1)	Cost Per Pupil (2)	Number of Districts (3)
1	$1131	50
2	1198	50
3	1239	50
4	1278	50
5	1307	50
6	1336	50
7	1381	50
8	1430	50
9	1503	50
10	1584	50
11	1762	50
12	1919	50
13	2166	50
14	2580	55

services.

In the Sequential Simplex Model theory, expenditure level flows into instructional services through several important measures. These are staff salaries, staff adequacy (including class size), and expenditures for instructional materials and supplies. This flow of expenditures, of course, may be viewed in the Sequential Simplex Model theory as being translated into staff characteristics such as teaching experience, training, and level of education.

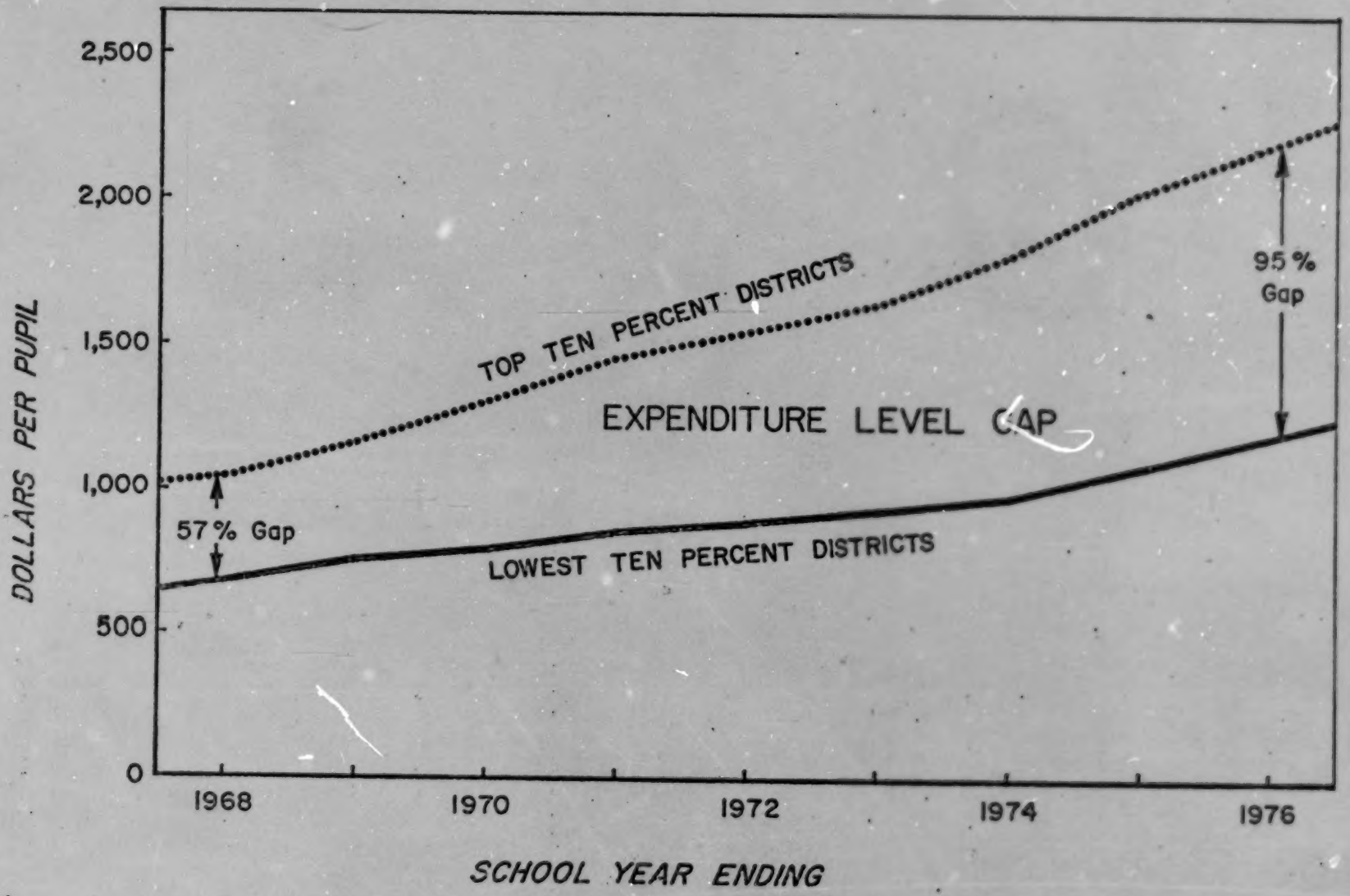

Figure 6.6. The Expenditure Level Gap, New York State School Districts, 1967-1977.

TABLE 4

MEDIAN VALUES FOR EXPENDITURE LEVEL FOR EACH OF FOURTEEN EXPENDITURE LEVEL GROUPINGS, SHOWING ABSOLUTE DIFFERENCES BETWEEN EACH OF NINETY ONE POSSIBLE COMBINATIONS

GROUP NUMBER	MEDIAN EXPEN. LEVEL	ABSOLUTE VALUE DIFFERENCES BETWEEN EXPENDITURE LEVEL GROUPINGS												
		1	2	3	4	5	6	7	8	9	10	11	12	13
1	1131													
2	1198	67												
3	1239	108	41											
4	1278	147	80	39										
5	1307	176	109	68	29									
6	1336	205	138	97	58	29								
7	1381	250	183	142	103	74	45							
8	1430	299	232	191	152	123	94	49						
9	1503	372	305	264	225	196	167	122	73					
10	1584	453	386	345	306	277	248	203	154	81				
11	1762	631	564	523	484	455	426	381	332	259	178			
12	1919	788	721	680	641	612	583	538	489	416	335	157		
13	2166	1035	968	927	888	859	830	785	736	663	582	404	247	
14	2580	1449	1382	1341	1302	1273	1244	1199	1150	1077	996	818	661	414

This table should be read as follows: The absolute difference Col. (1) between the median expenditure level for Group 1 and Group 2 is $67 per pupil ($1198 - $1131). The absolute difference Col. (2) between the median expenditure level for Group 2 and Group 3 is $41 per pupil ($1239 - $1198).

As is indicated in Figure 6.7, the flow of expenditure level into instructional services is most pronounced. The relationship is a high, positive, and signficant one. Moreover, this condition has existed for over half a century, not only in New York State, but also in a group of school districts throughout the United States called the Associated Public School Systems. In New York State, school districts averaging $1131 per pupil for expenditure level spent $863 per pupil for instructional services -- 76 percent. In the middle of the expenditure level distribution, school districts expended on average $1430 per pupil for expenditure level and $1067 per pupil for instructional services -- 75 percent. Comparable data for the upper end of the expenditure level distribution shows districts expending $2580 per pupil for expenditure level and $1891 for instructional services -- 73 percent. As per pupil expenditures increase, the percent devoted to instructional services decreases only slightly.

THE FLOW OF EXPENDITURES FOR INSTRUCTIONAL SERVICES INTO SALARIES, STAFF RATIOS, AND INSTRUCTIONAL MATERIALS

Expenditures for instructional services flow into teachers salaries, class size and/or staff ratios, and into instructional materials and supplies. Figures 6.8 and 6.9 depict the flow of per pupil expenditures for instructional services into per pupil expenditures for textbooks and instructional materials and supplies. As per pupil expenditures

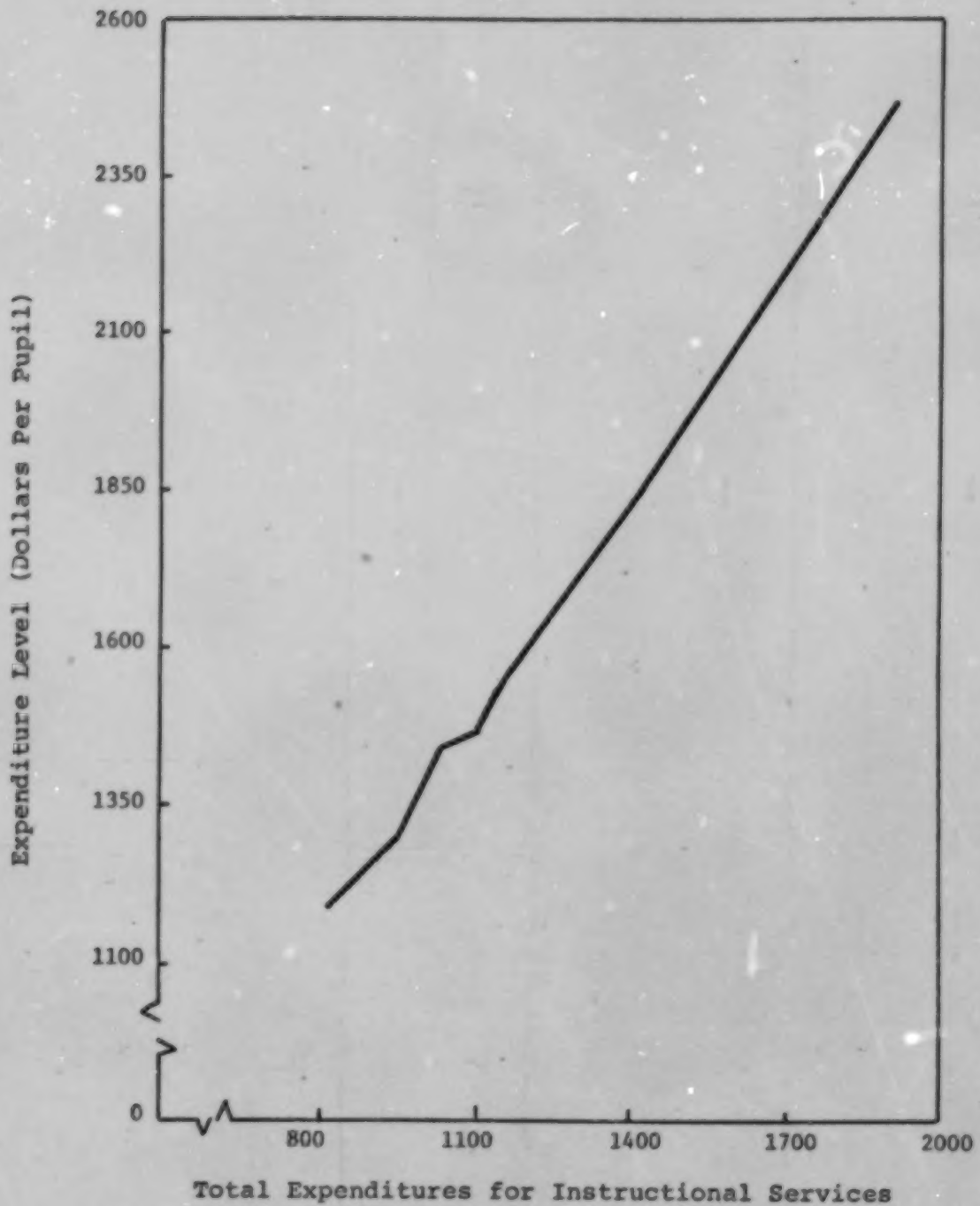
2600
2350
2100
1850
1600
1350
1100
0
Expenditure Level (Dollars Per Pupil)
800
1100
1400
1700
2000
Total Expenditures for Instructional Services
Per Pupil

FIGURE 6.7

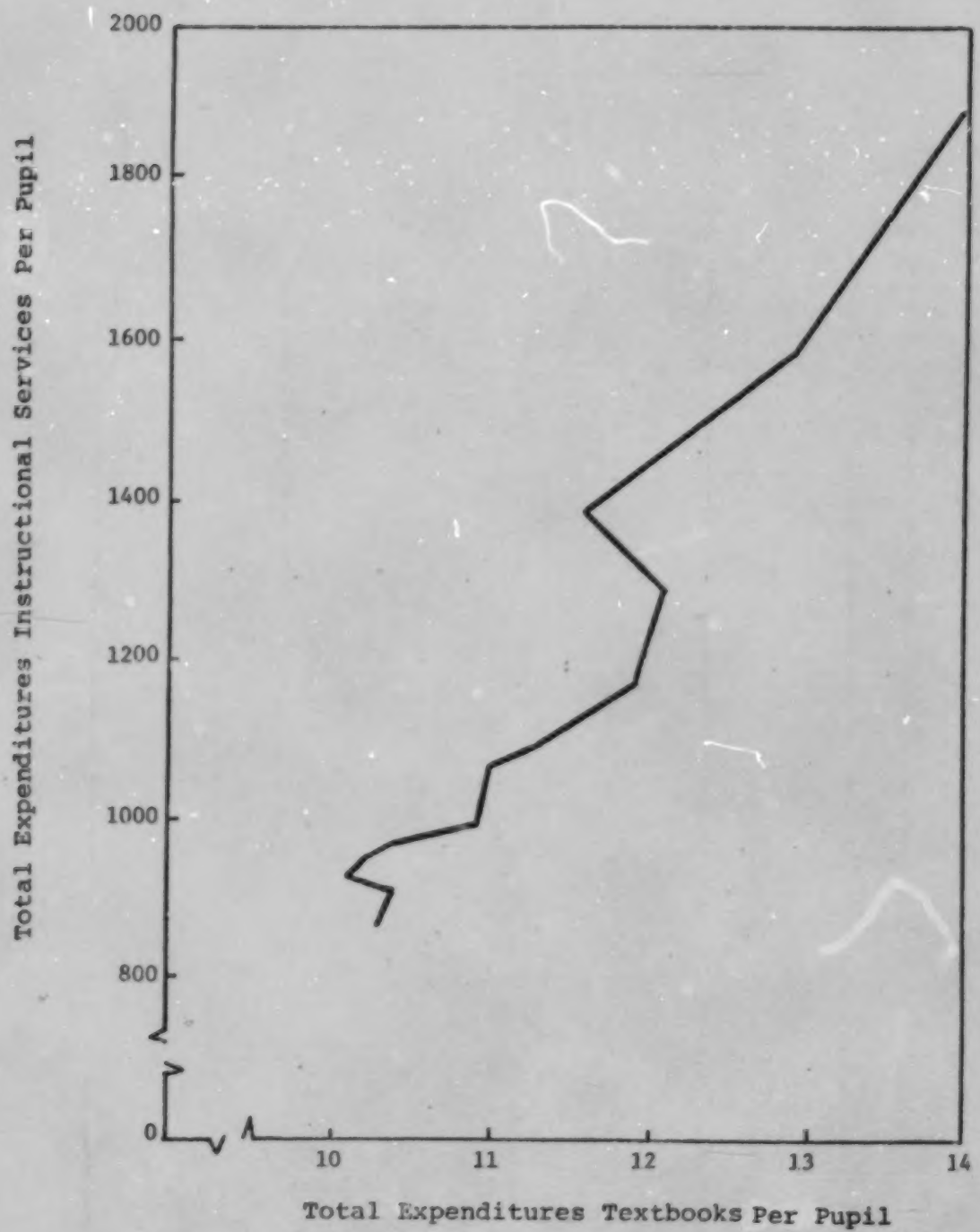
Total Expenditures Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
10
11
12
13
14
Total Expenditures Textbooks Per Pupil

FIGURE 6.8

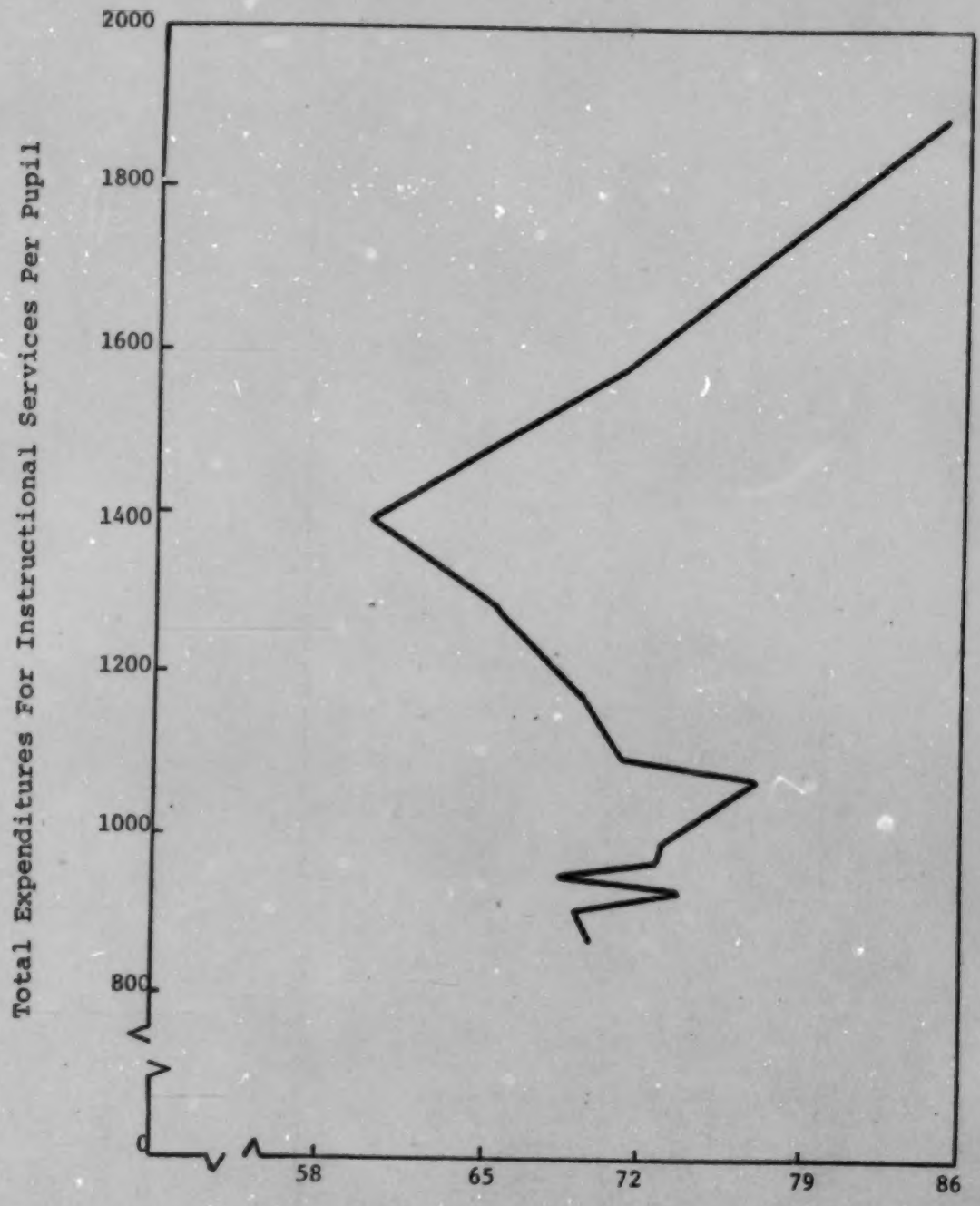
2000
1800
1600
1400
1200
1000
800
0
58
65
72
79
86
Total Expenditures For Instructional Services Per Pupil
Total Expenditures For Instructional
Materials and Supplies Per Pupil

FIGURE 6.9

for instructional services increase, so do per pupil expenditures for textbooks, but in a zig-zag fashion. Of the 91 statistical group comparisons, 20 were significantly different. The flow into materials and supplies is more convoluted than that for textbooks and of the 91 group comparisons only 4 were statistically significant. Per pupil expenditures for textbooks varied from $10 to $14 per pupil on average as per pupil expenditures for instructional services increased from $863 to $1891. Over the same range for expenditures for instructional services, per pupil expenditures for instructional materials and supplies varied from $71 to $84 per pupil. Are these dollar differences truly significant in terms of equality of educational opportunities? And are the statistics of analysis of variance and covariance inadequate and inappropriate to evaluate the disequalizing vector effects of small differences in per pupil expenditures for textbooks and instructional materials and supplies?

Not only do expenditures for instructional services flow into textbooks, and instructional materials, but also into salaries and staff adequacy. Often times, State legislators maintain that "to increase State aid for public education only results in higher and higher teacher salaries." Utilizing the Sequential Simplex Model to assess the effectiveness of this statement as an administrative policy reveals the following: as expenditure levels increase, not only do professional salaries increase,

but so do professional staffing ratios. This is evident from Figures 6.10 and 6.11 for salaries, and Figures 6.12 to 6.18 inclusive for staffing ratios.

For New York State, despite the prevalence of single salary schedules, the flow of expenditures from instructional services into salaries has resulted in median salaries being higher for secondary compared to elementary teachers. This is true along the entire distribution for instructional services expenditures. At the low end, salary differences between secondary and elementary staff average about $1100 and at the high end about $1500.

In the Sequential Simplex Model Theory, staff ratios represent a family of measures with great implications for the quality of education students receive. Some groups have expressed great concerns that increases in instructional expenditures just results in greater increases in the administrative bureaucracy rather than in classroom teachers. As instructional expenditures increased, total professional staff ratios (staff per 1000 pupils) increased from 53 professionals per 1000 pupils to 76; classroom teacher ratios increase from 47 per 1000 pupils to 65; and other professional staff (nonclassroom teachers) from 6 to 11 per 1000 pupils. Not only did the flow of instructional expenditures produce higher secondary than elementary salaries, but also higher staff ratios. For example, as per pupil expenditures for instruction increased, elementary classroom teacher ratios went from 49 to 64 but secondary

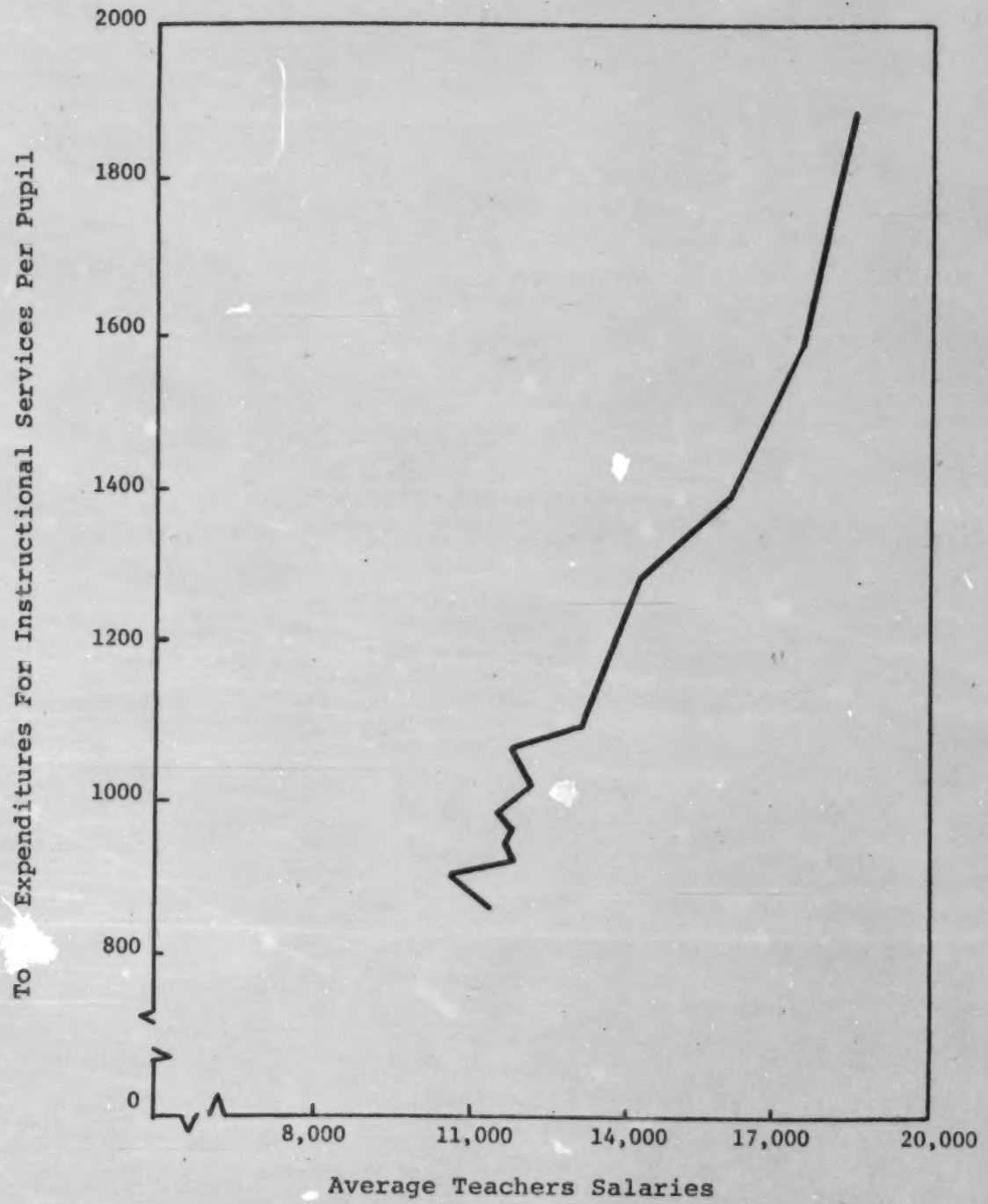
2000
1800
1600
1400
1200
1000
800
0
To Expenditures For Instructional Services Per Pupil
8,000
11,000
14,000
17,000
20,000
Average Teachers Salaries
Grades 7-12

FIGURE 6.10

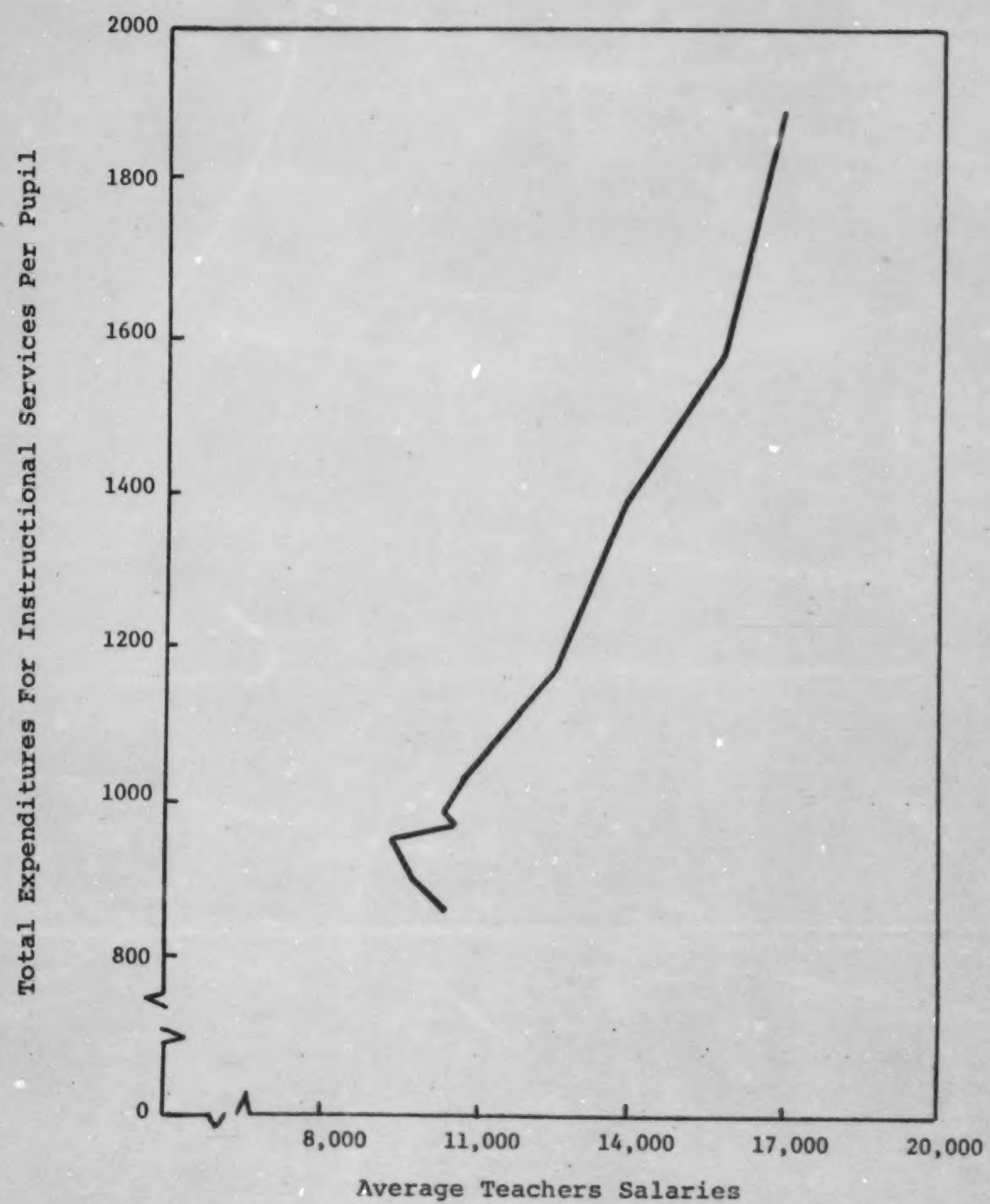
Total Expenditures For Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
8,000
11,000
14,000
17,000
20,000
Average Teachers Salaries
Grades K-6

FIGURE 6.11

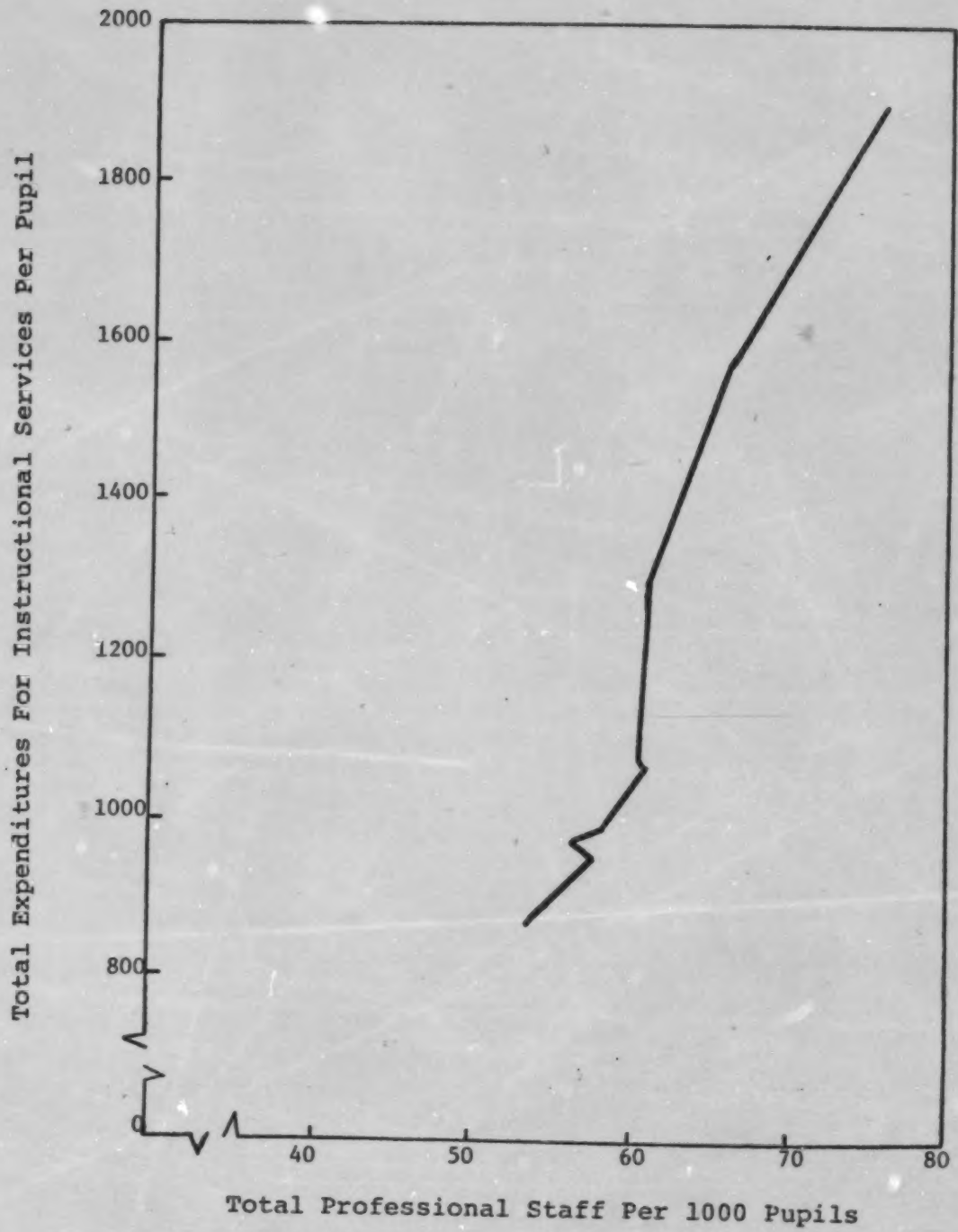
Total Expenditures For Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
40
50
60
70
80
Total Professional Staff Per 1000 Pupils

FIGURE 6.12

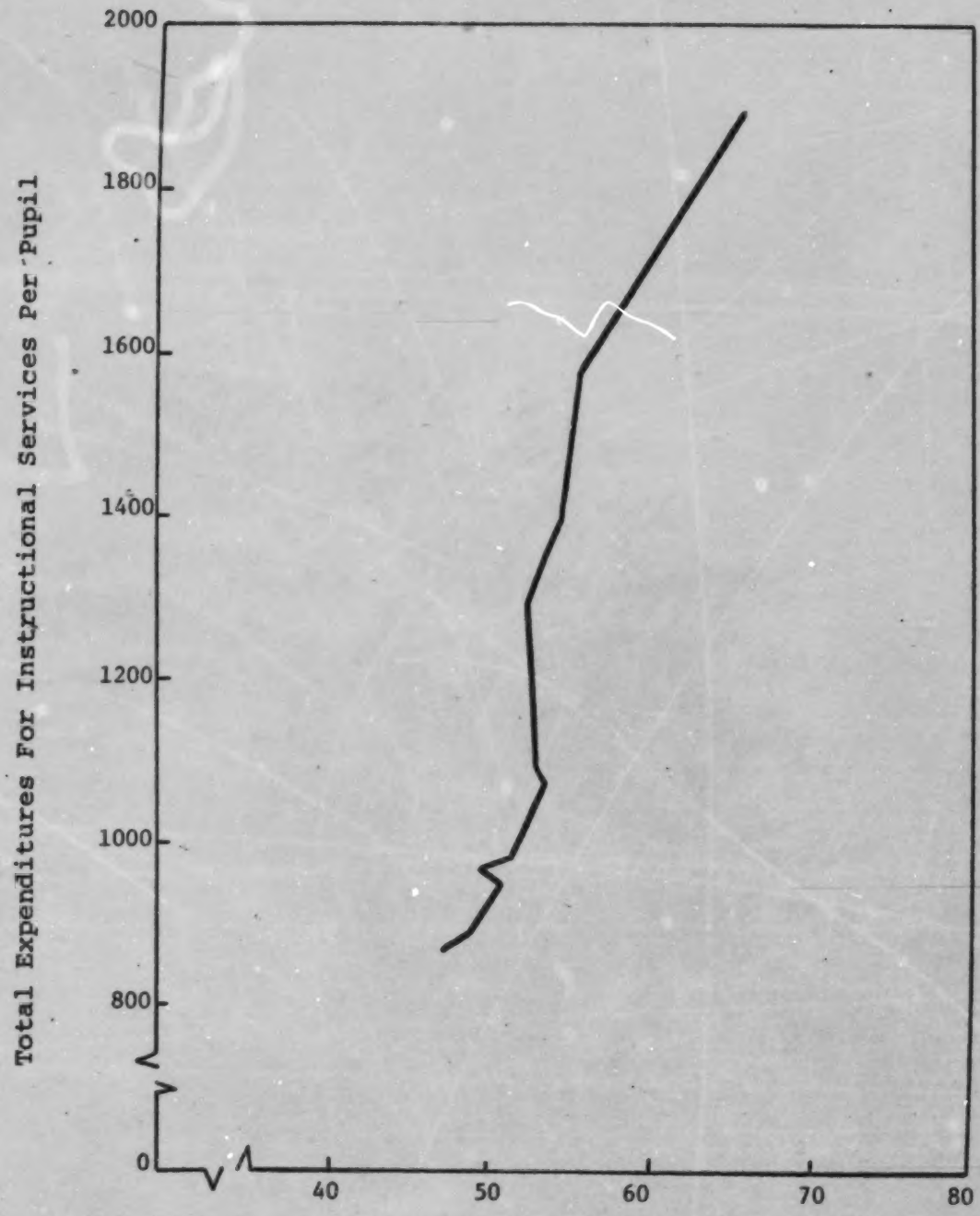
Total Expenditures For Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
40
50
60
70
80
Total Classroom Teachers Per 1000 Pupils

FIGURE 6.13

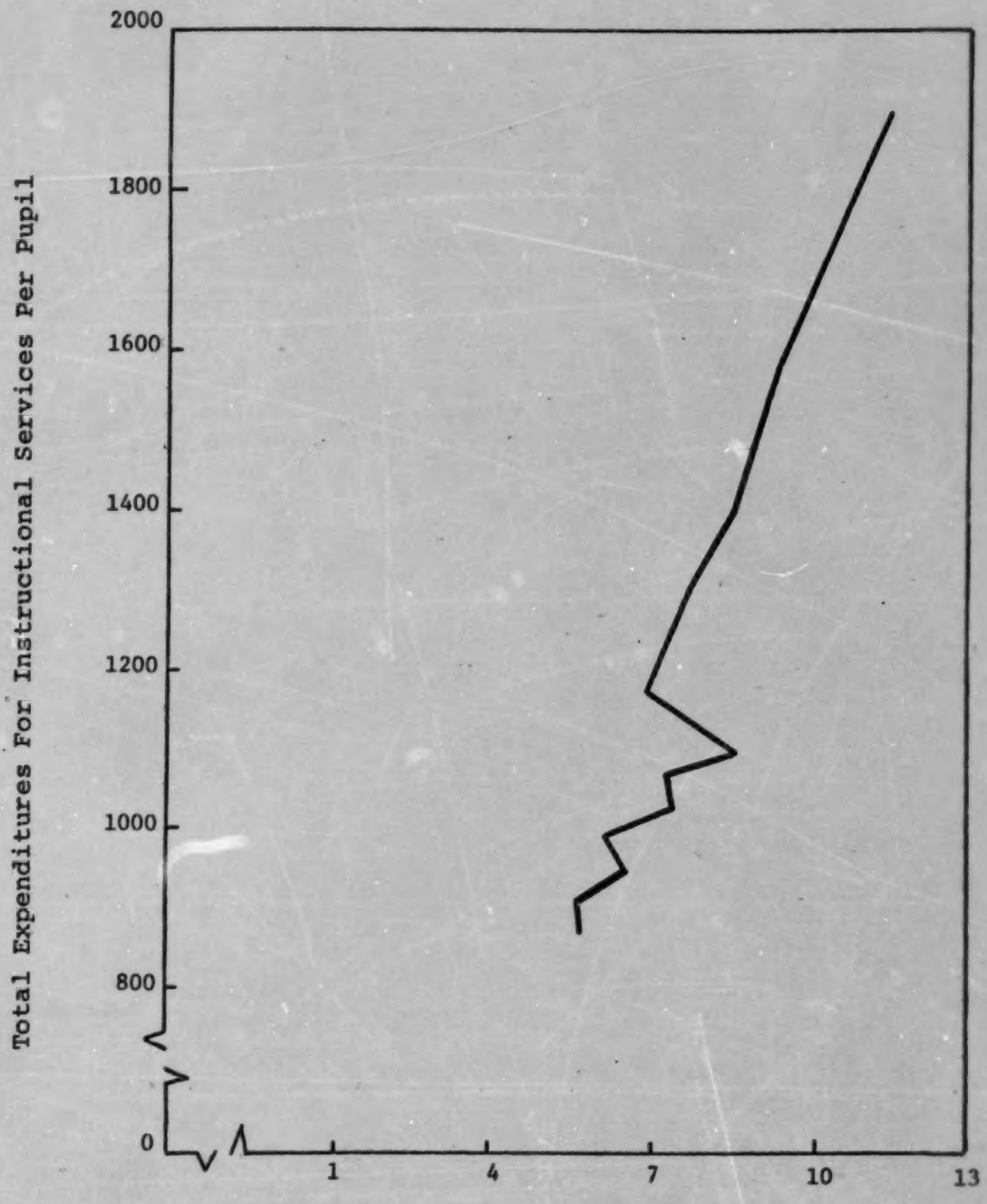
Total Expenditures For Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
1
4
7
10
13
Total Other Professional Staff Per 1000 Pupils

FIGURE 6.14

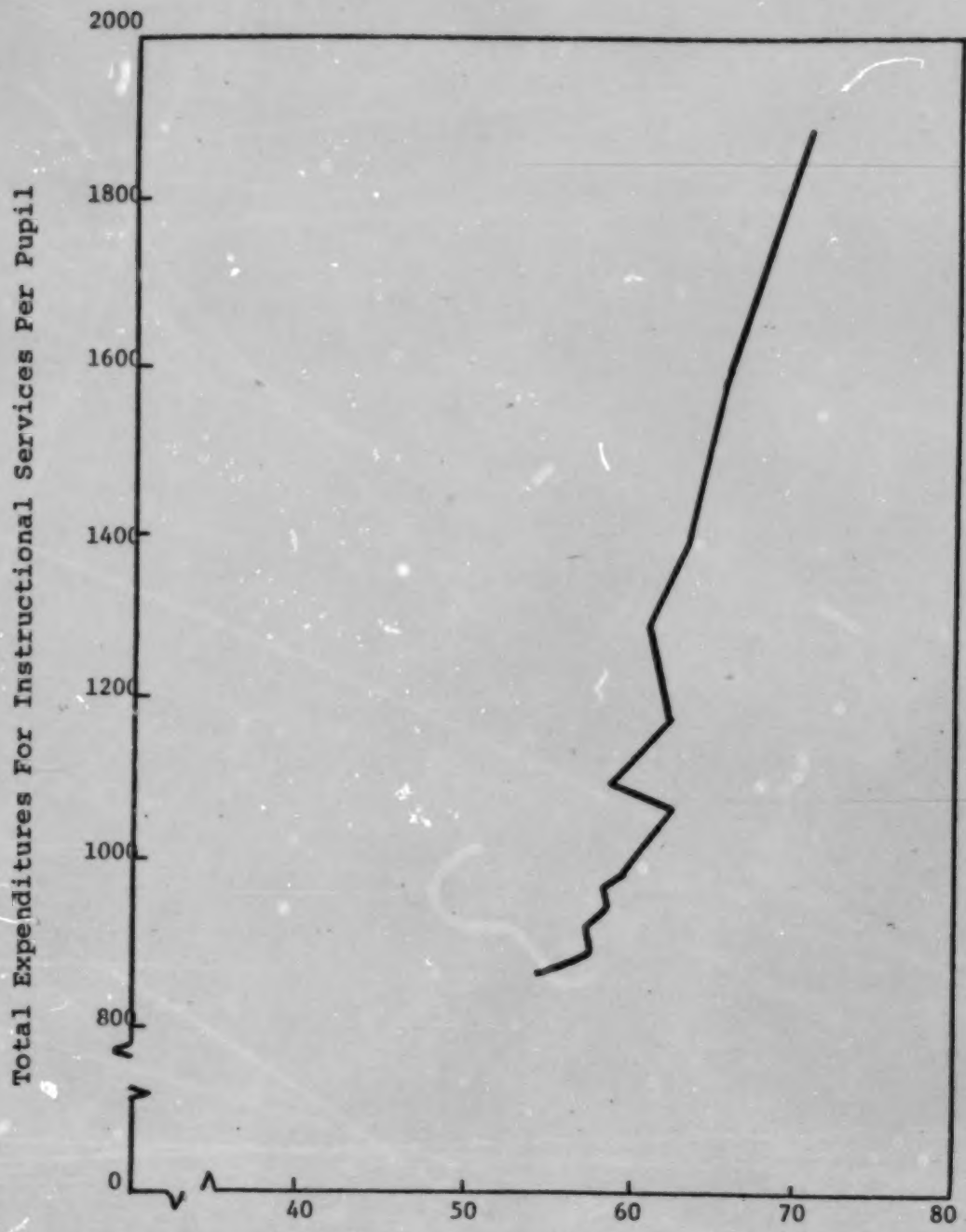
Total Expenditures For Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
40
50
60
70
80
Classroom Teachers Per 1000 Secondary Pupils
(Grades 7-12)

FIGURE 6.15

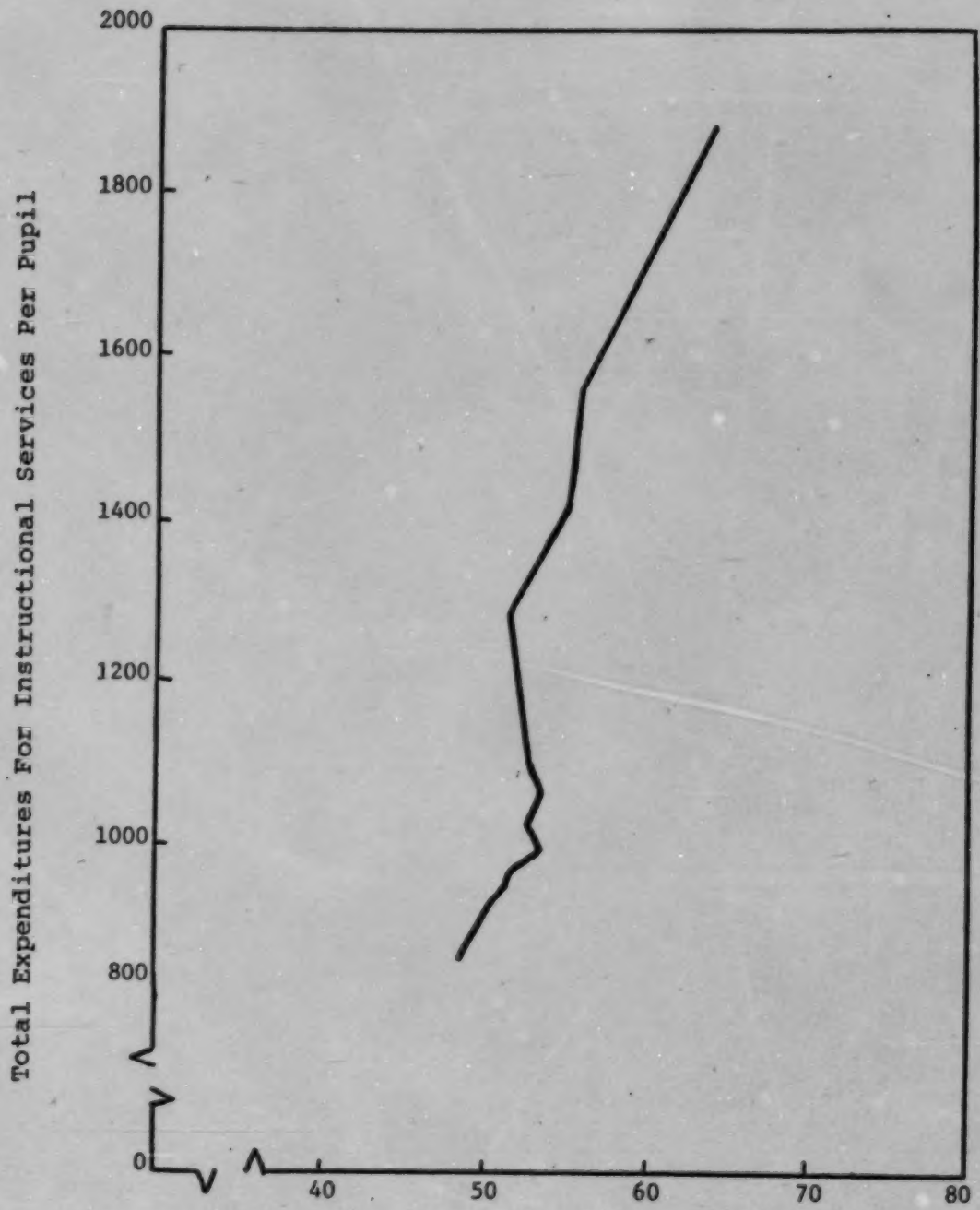
Total Expenditures For Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
40
50
60
70
80
Classroom Teachers Per 1000 Elementary Pupils
(Grades K-6)

FIGURE 6.16

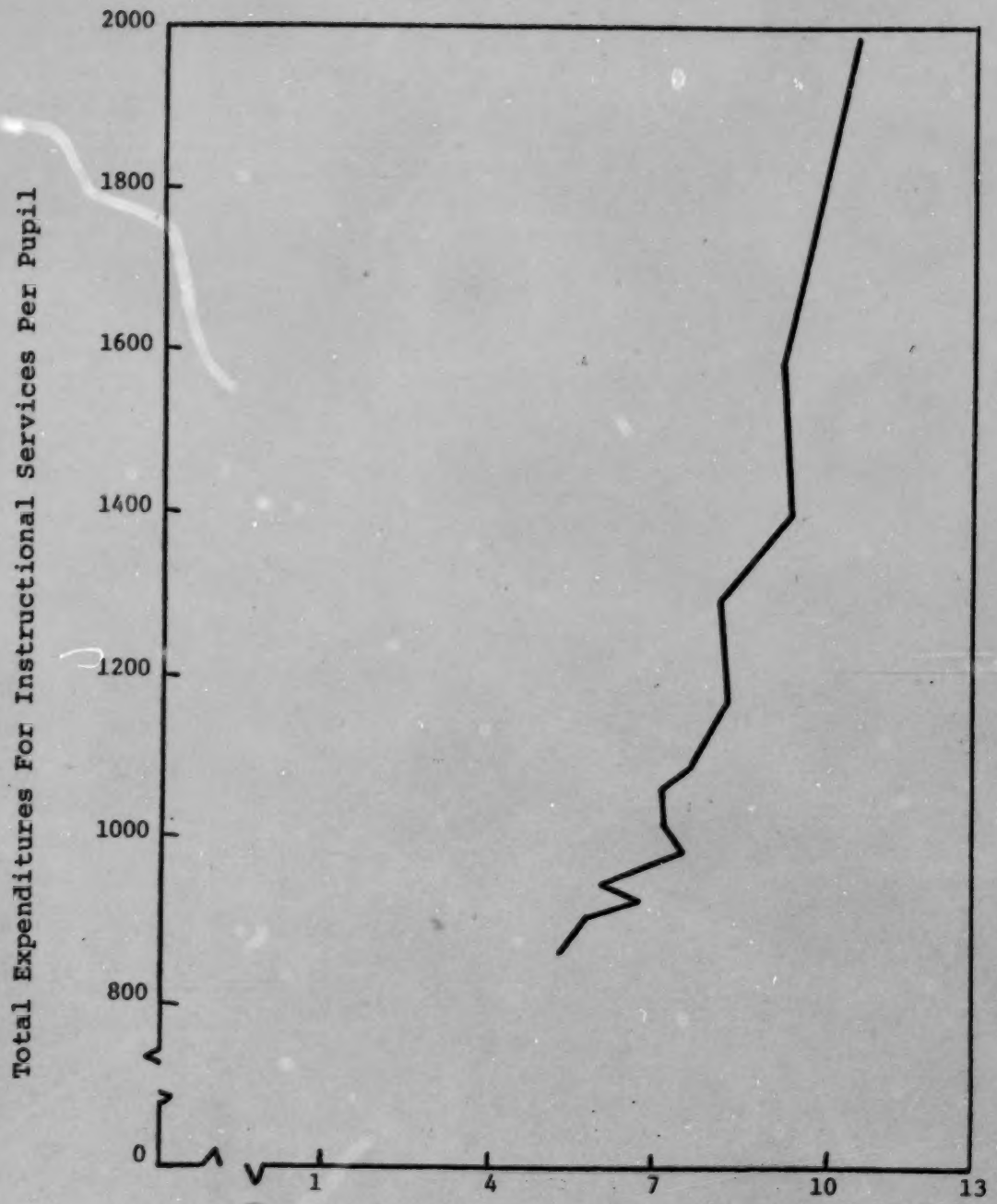
Total Expenditures For Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
1
4
7
10
13
Other Professional Staff Per 1000 Secondary Pupils (Grades 7-12)

FIGURE 6.17

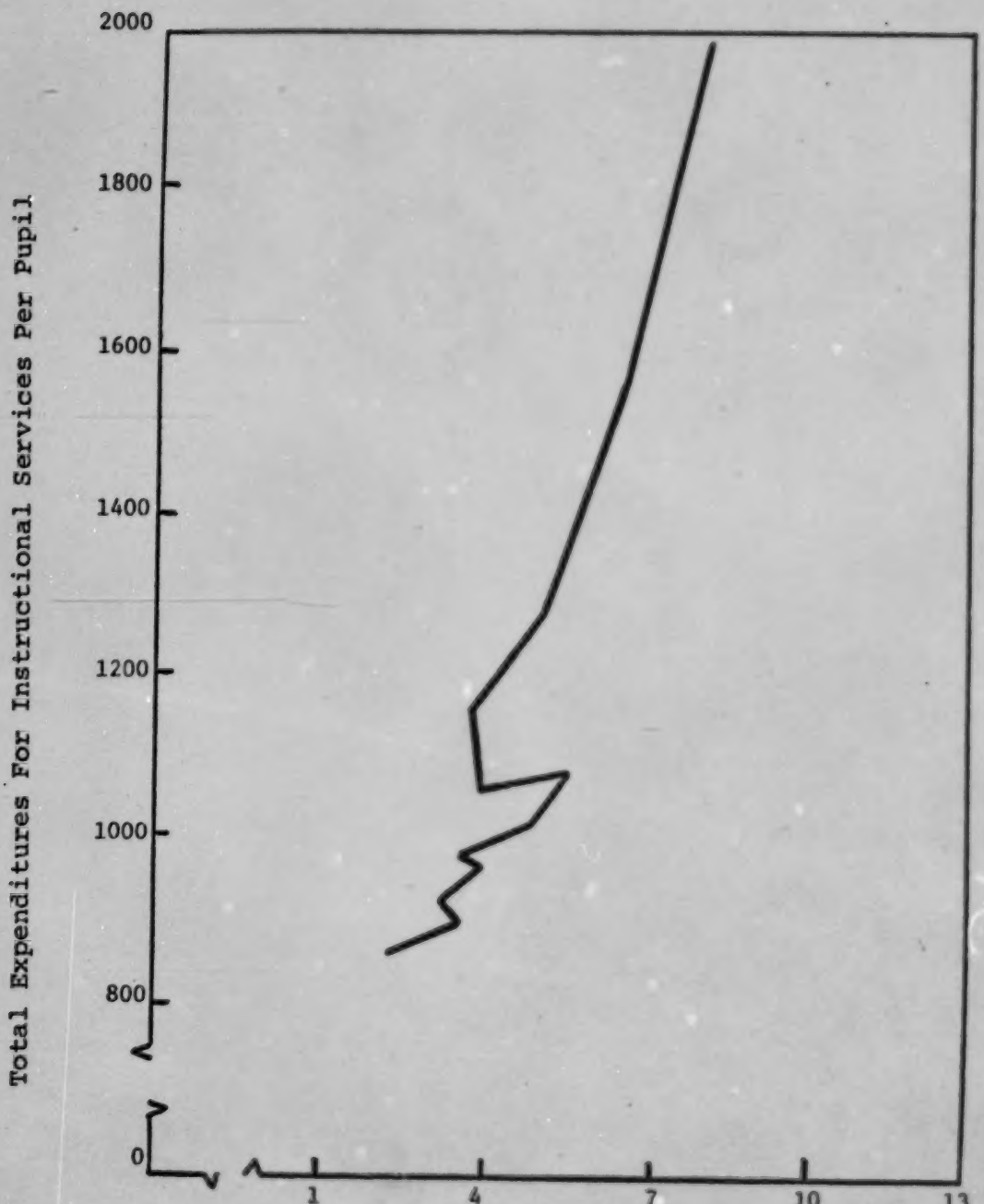
Total Expenditures For Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
1
4
7
10
13
Other Professional Staff Per 1000 Elementary
Pupils (Grades K-6)

FIGURE 6.18

ratios went from 54 to 71. Similar staff ratio differences are evident for nonclassroom professionals. The flow of increased per pupil expenditures for instructional services from $863 to $1891 per pupil resulted in elementary non-classroom teacher professional staff ratios going from 2 to 8 per 1000 pupils compared to secondary ratios going from 5 to 11 per 1000 pupils.

THE FLOW OF EXPENDITURES FOR INSTRUCTIONAL SERVICES INTO STAFF CHARACTERISTICS -- EDUCATION, TRAINING, AND EXPERIENCE

In the Sequential Simplex Model Theory, community characteristics, particularly such socio-economic ones as percent of college graduates, median family income, percent homeowners, percent unskilled workers, and the level of educational expectations persons have for schools, of not only the present but also the past, flow into local wealth. Local wealth, coupled with State legal and administrative mandates, flows into local expenditure levels. Expenditure level flows into instructional services which, in turn, determine staff salaries and staff ratios. Salary and staff ratio levels are then translated into various staff characteristics such as education, training, and experience.

As expenditure levels increase, the percentage of teachers having only a bachelor's degree decreases, as does the percentage of teachers with bachelor's plus 30 semester hours, but the percentage of teachers with masters degrees

increases. Specifically, districts with expenditures for instructional services of $863 have on average teaching staffs composed of 49 percent with bachelor degrees, 22 percent with bachelor degrees plus 30 semester hours, and 24 percent with masters degrees. As per pupil expenditures for instructional services increase, the percentage of teachers with only bachelor degrees declined as did that for teachers with only bachelor degrees plus 30 semester hours, but the percentage of teachers with masters degrees almost doubled. For example, at $1891 per pupil for instructional services, districts had on average teaching staffs composed of 16 percent bachelor degrees, 14 percent bachelors plus 30 semester hours, and 40 percent master degrees. Figures 6.19, 6.20, 6.21, and 6.22 show the flow of instructional expenditures into such staff characteristics as education, training, and experience. One should not assume that such a flow is linear and direct. The fact of the matter is that the flow of instructional expenditures into its component measures involves a series of complex, strategical decisions not easy to delineate or evaluate. The resultant matrix is derived from a series of decisions at various operating levels. In other words, many persons and agencies get their hands into the expenditure flow vectors, creating a confounding and confusing matrix of forces.

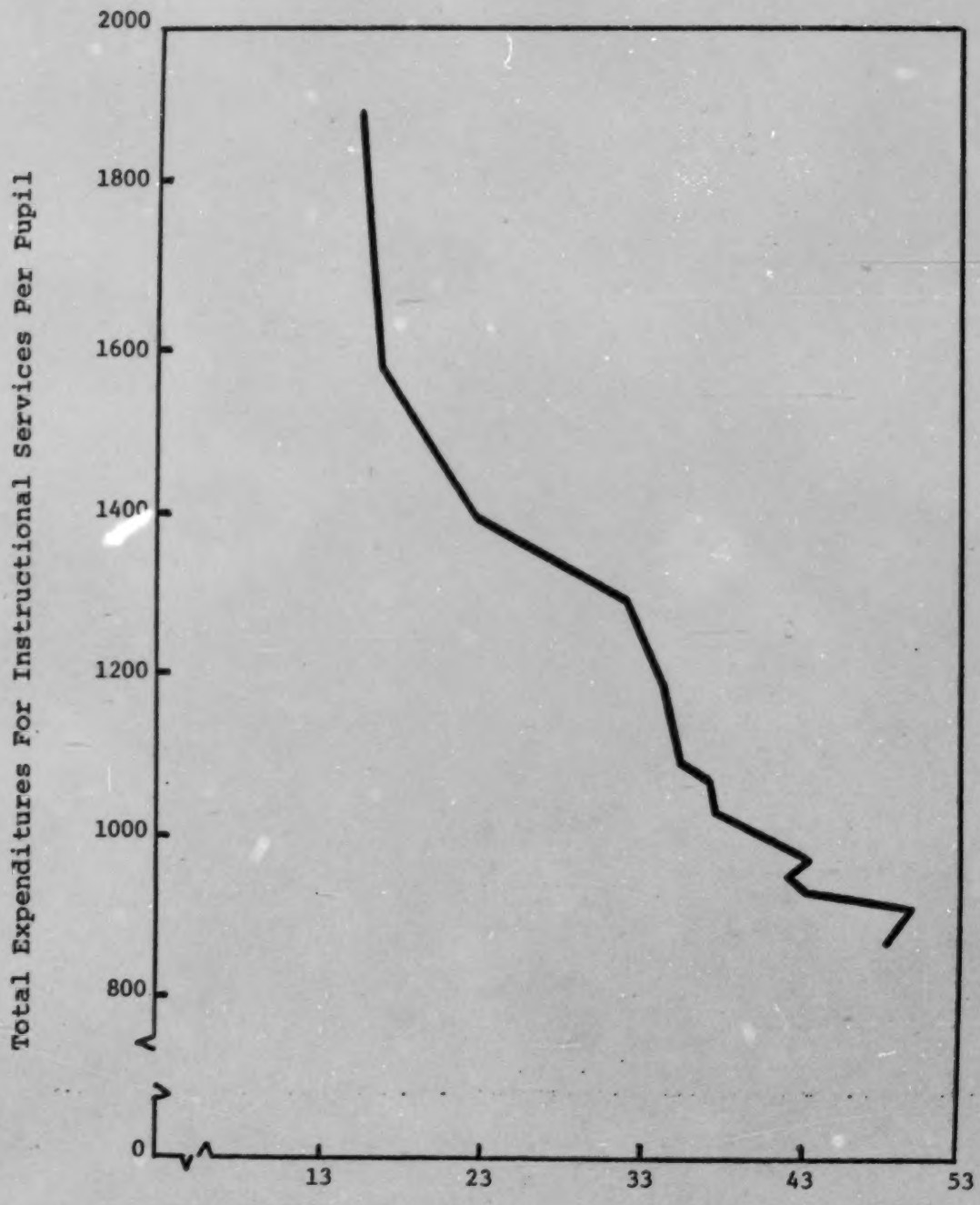
Total Expenditures For Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
13
23
33
43
53
Percent of Teachers Holding Bachelors Degree Only

FIGURE 6.19

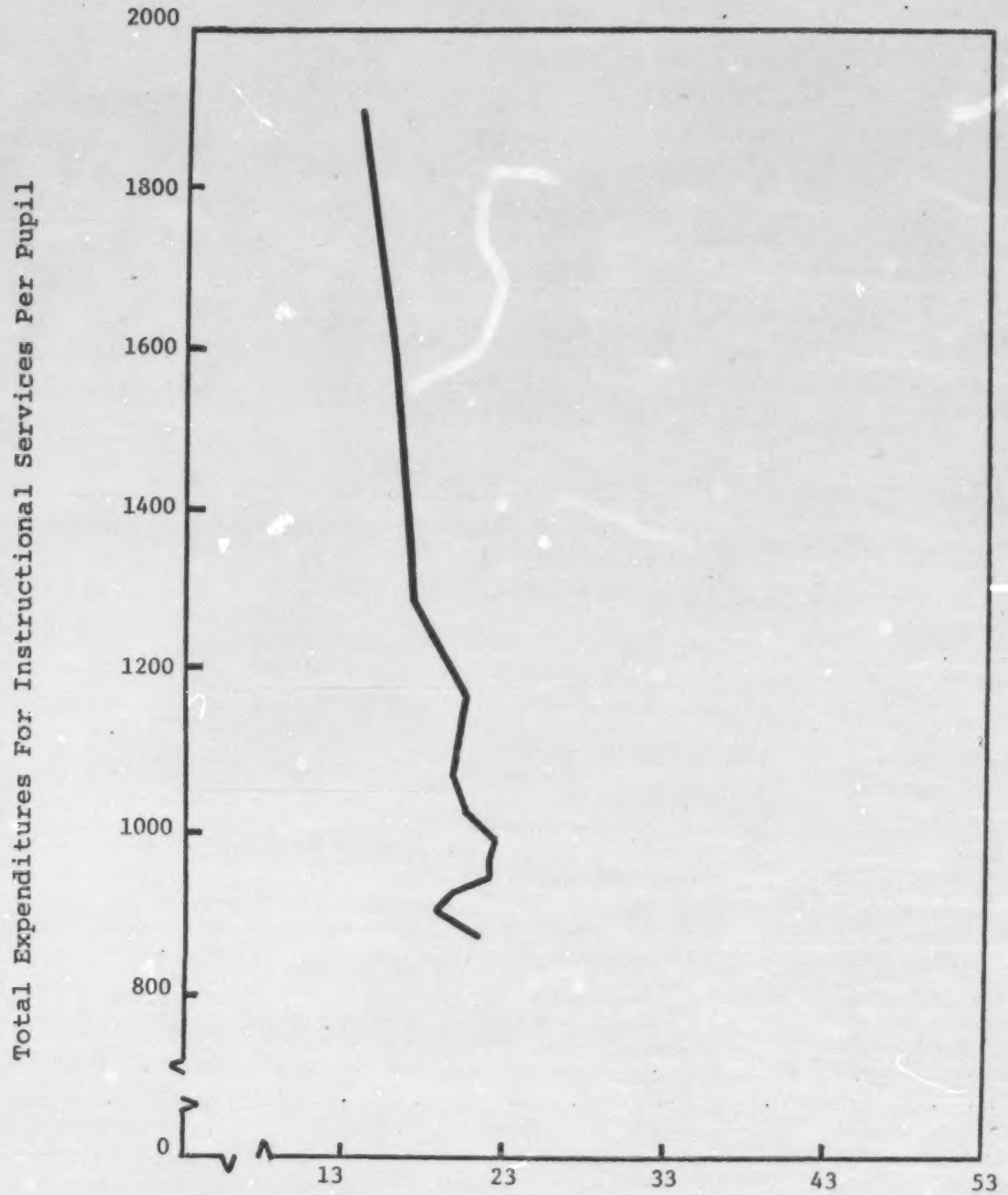
Total Expenditures For Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
13
23
33
43
53
Percent of Teachers Holding Bachelors Degree
Plus Thirty Hours of Graduate Credit

FIGURE 6.20

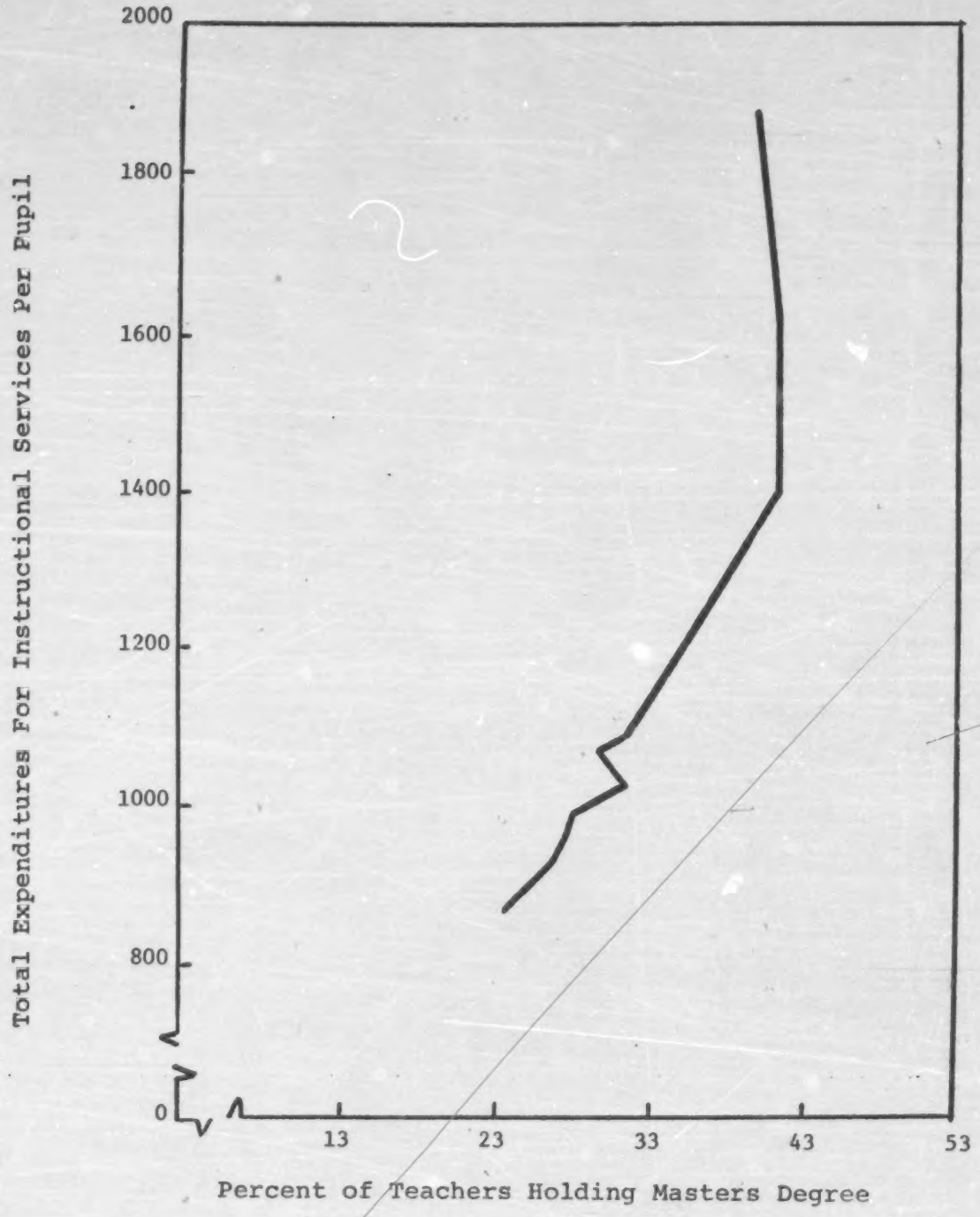
Total Expenditures For Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
13
23
33
43
53
Percent of Teachers Holding Masters Degree

FIGURE 6.21

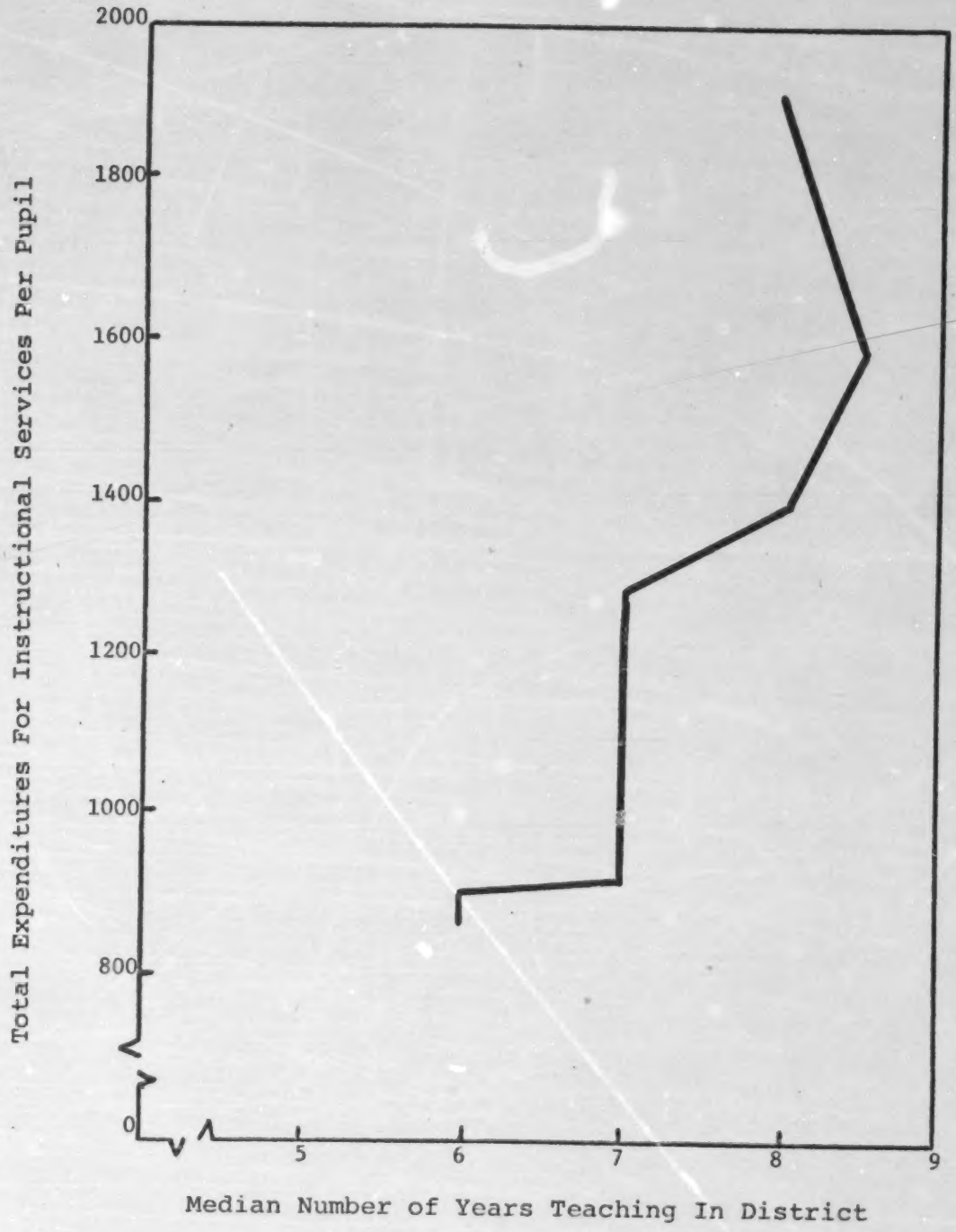
Total Expenditures For Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
5
6
7
8
9
Median Number of Years Teaching In District

FIGURE 6.22

THE FLOW OF EXPENDITURES FROM INSTRUCTIONAL SERVICES INTO PUPIL PERFORMANCE MEASURES

In the Sequential Simplex Model Theory, it is important to ascertain the force vectors (both their scalar magnitude and force direction) effects upon school system quality. The quality of education children receive can be defined in terms of a number of goals and objectives. In New York, the Board of Regents has set such goals as the following for public education:

1. To develop in each child the basic skills of reading, writing, arithmetic, spelling, and listening to the best of his/her potential.

2. To develop in each and every student a practical understanding and a working respect for the principles of self-government.

3. To prepare each young citizen to fulfill competently his/her responsibilities of adult citizenship.

4. To impart to each student the knowledge and skills that he needs to earn his/her own living.

5. To imbue in each student a sense of responsibility for his/her own personal development and ethical conduct.

6. To instill in each student the proper attitudes and study techniques to permit him/her to assume effectively his own responsibility for self-study and for life-long continuous learning.

7. And to inculcate in each child respect for the rights, dignity, freedom, and worth of each person whatever be his/her race, religion, creed, or ethnic background.

In this study, we have not assessed the flow of expenditures into all aspects of school quality, nor even

that part promulgated by the New York State Board of Regents. We have looked at only a small part of the cognitive domain and nothing at all of the affective domain.

As expenditures for instructional services increase, median scores (grade equivalents) in reading and mathematics made by pupils in the third grade generally increase, as do those by sixth graders and by ninth graders. The relationship is not as pronounced for ninth as for sixth graders, nor as pronounced for sixth as for third graders. Figures 6.23 to 6.28 inclusive portray the flow of instructional expenditures into the pupil performance output measures of reading and arithmetic. No one should draw the inference that only this flow of expenditures as set forth in the Sequential Simplex Model Theory is the only one affecting pupil performance. Many other forces are at work here in addition to those of expenditures such as motivation, innate cognitive ability, and socio-economic forces. Clearly, the effects of intelligence and its surrogates affect pupil performance results.

Using the flow theory of the Sequential Simplex Model, children in the third grade in low expenditure districts (those spending about $863 per pupil for instructional services) scored on average 3.2 grade equivalents in mathematics and 3.5 in reading compared to children in third grade in high expenditure districts ($1891 per pupil) who scored on average 3.9 in mathematics and 3.7 in reading. As is evidenced by the graphs depicting the flow of expendi-

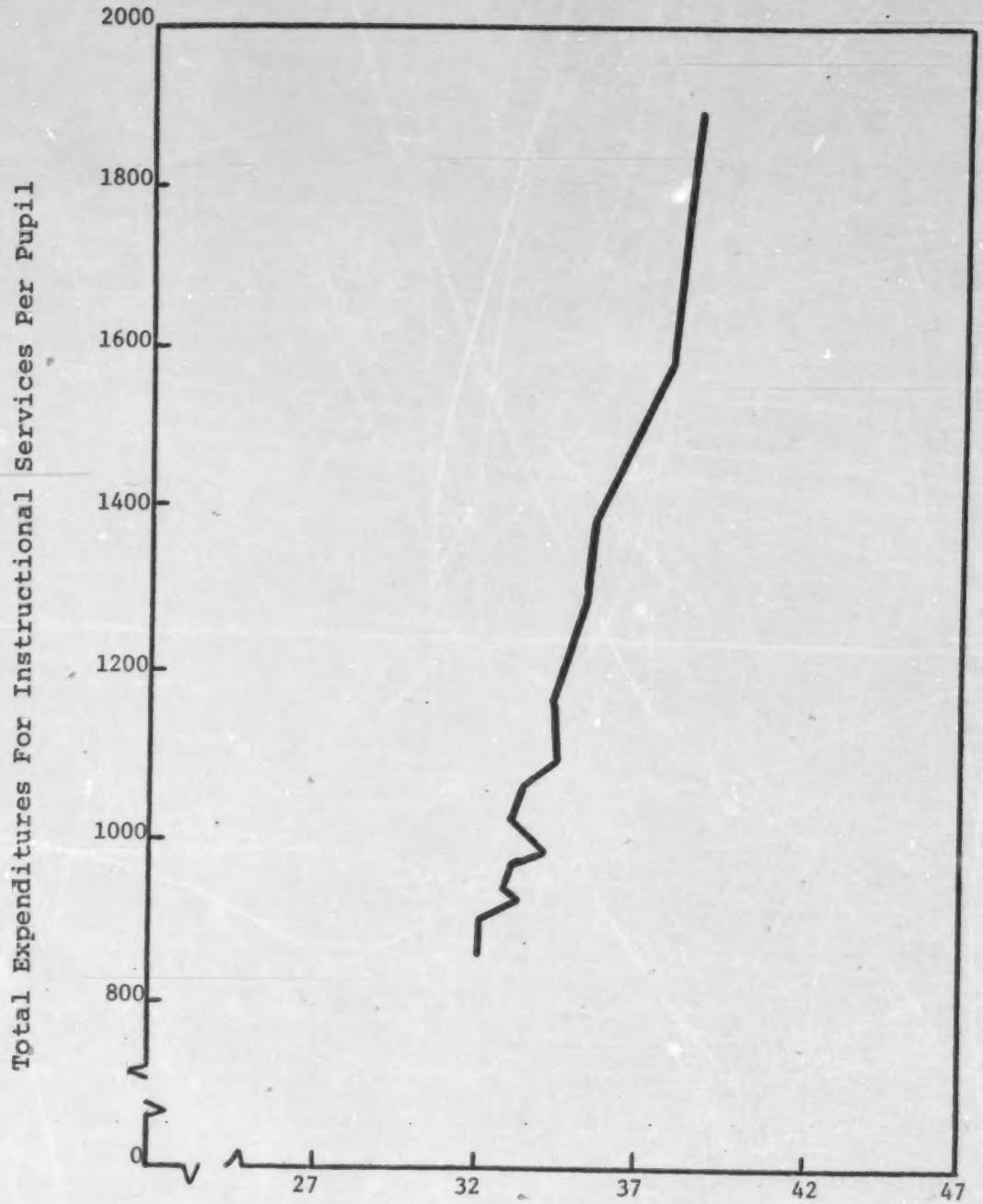
Total Expenditures For Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
27
32
37
42
47
Median Score on Pupil Evaluation Performance (PEP)
Mathematics Test - Grade 3

FIGURE 6.23

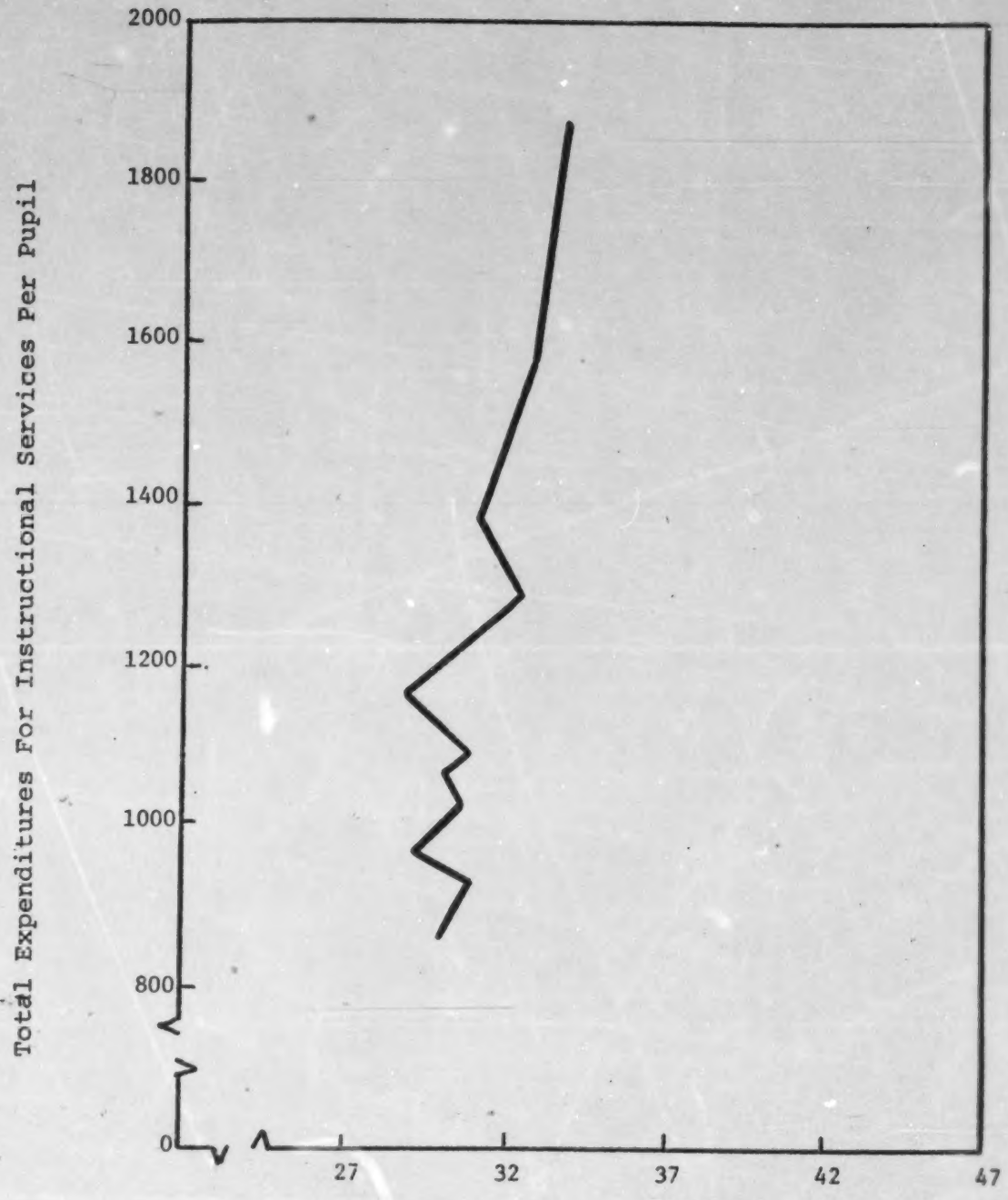
Total Expenditures For Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
27
32
37
42
47
Median Score on Pupil Evaluation Performance (PEP)
Mathematics Test - Grade 6

FIGURE 6.24

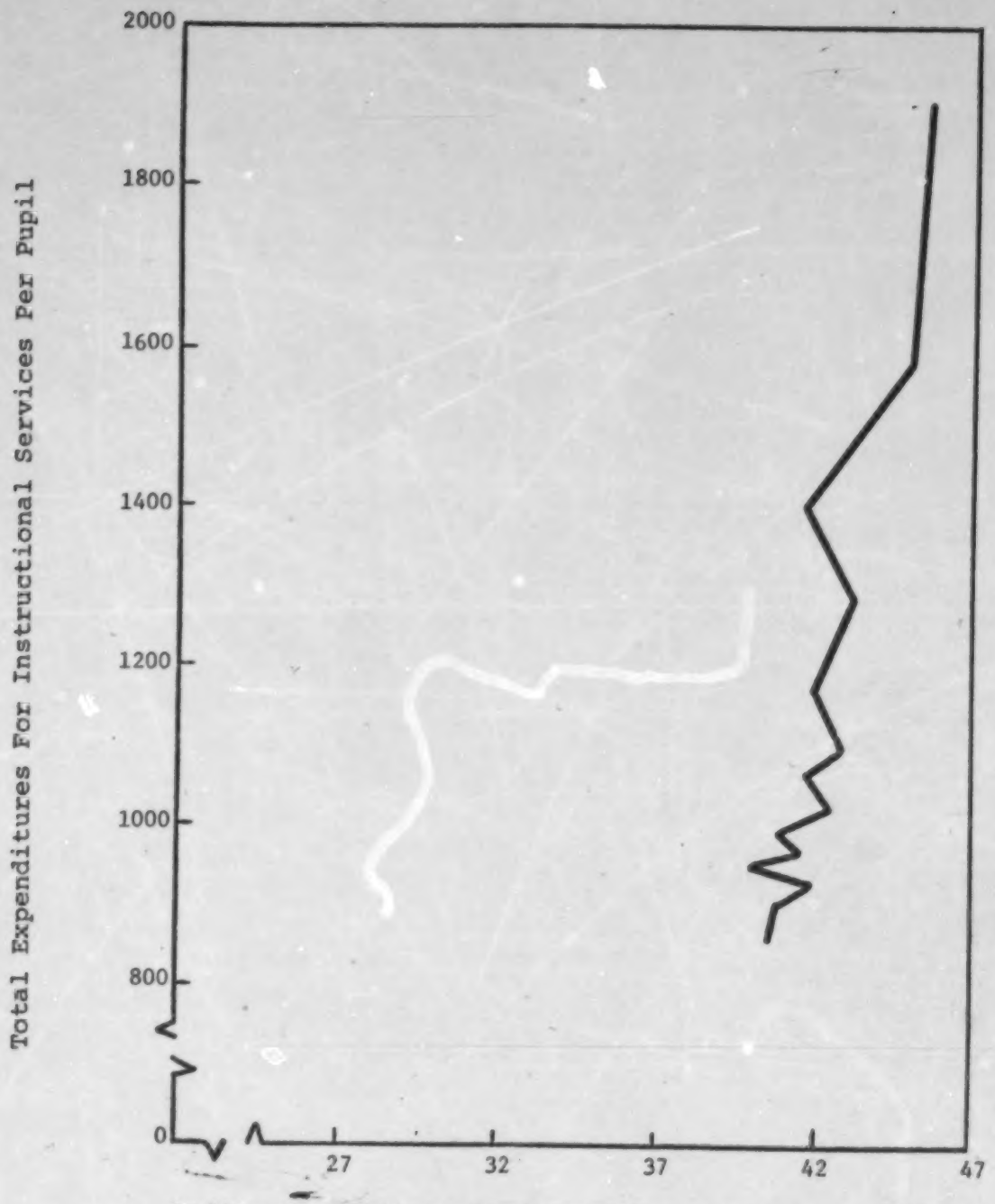
Total Expenditures For Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
27
32
37
42
47
Median Score on Pupil Evaluation Performance (PEP)
Mathematics Test - Grade 9

FIGURE 6.25

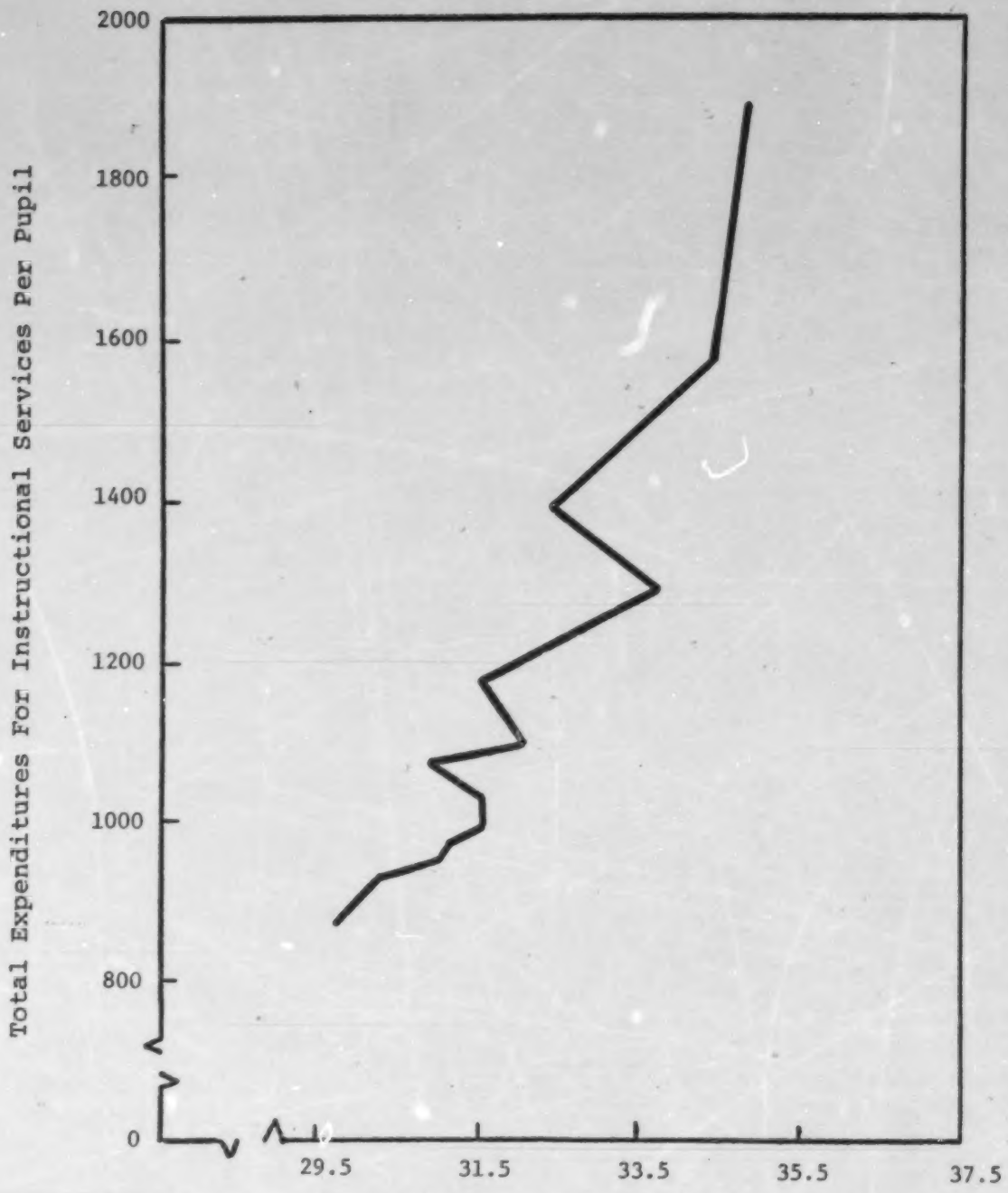
Total Expenditures For Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
29.5
31.5
33.5
35.5
37.5
Median Score on Pupil Evaluation Performance (PEP)
Reading Test - Grade 3

FIGURE 6.26

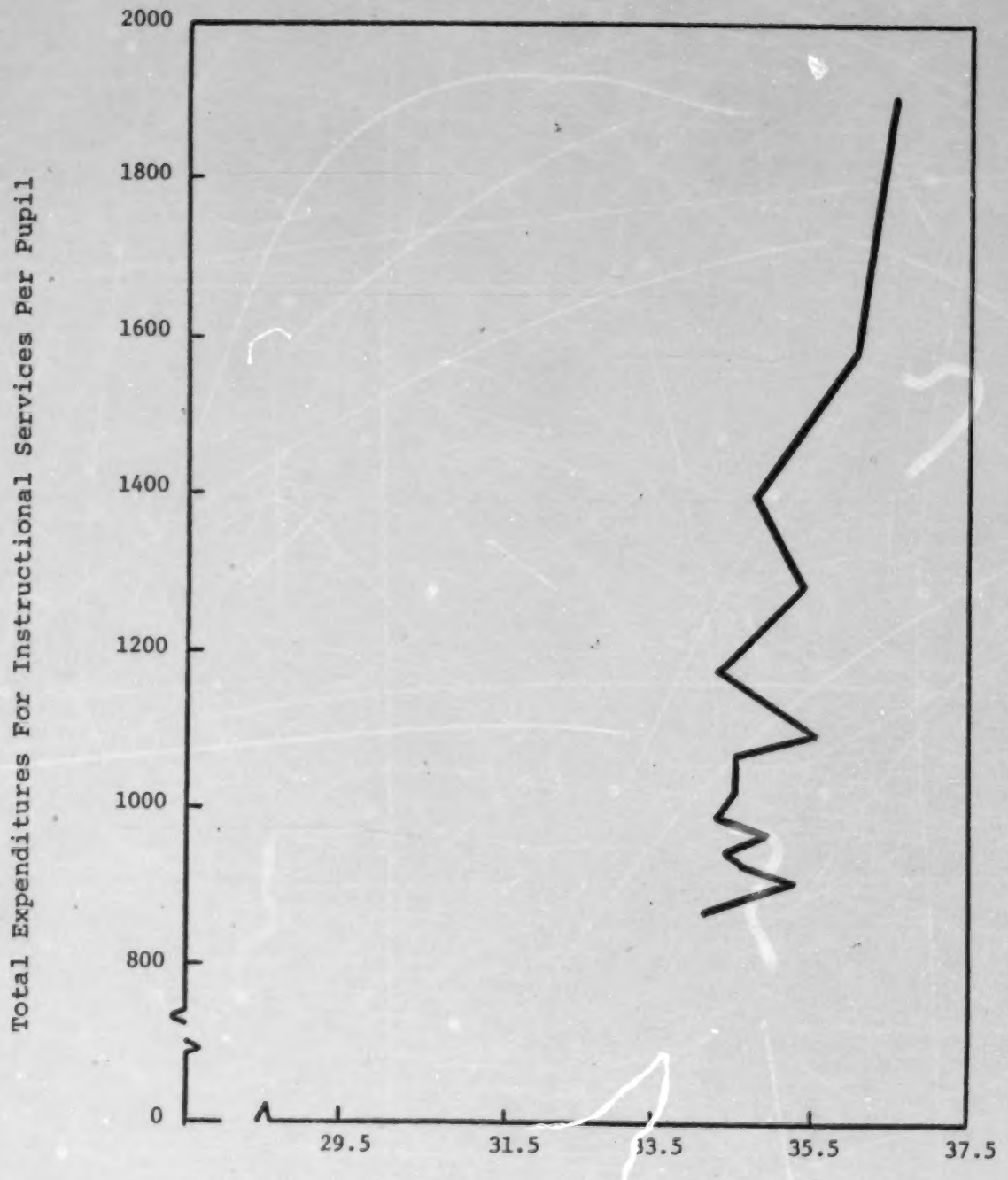
Total Expenditures For Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
29.5
31.5
33.5
35.5
37.5
Median Score on Pupil Evaluation Performance (PEP)
Reading Test - Grade 6

FIGURE 6.27

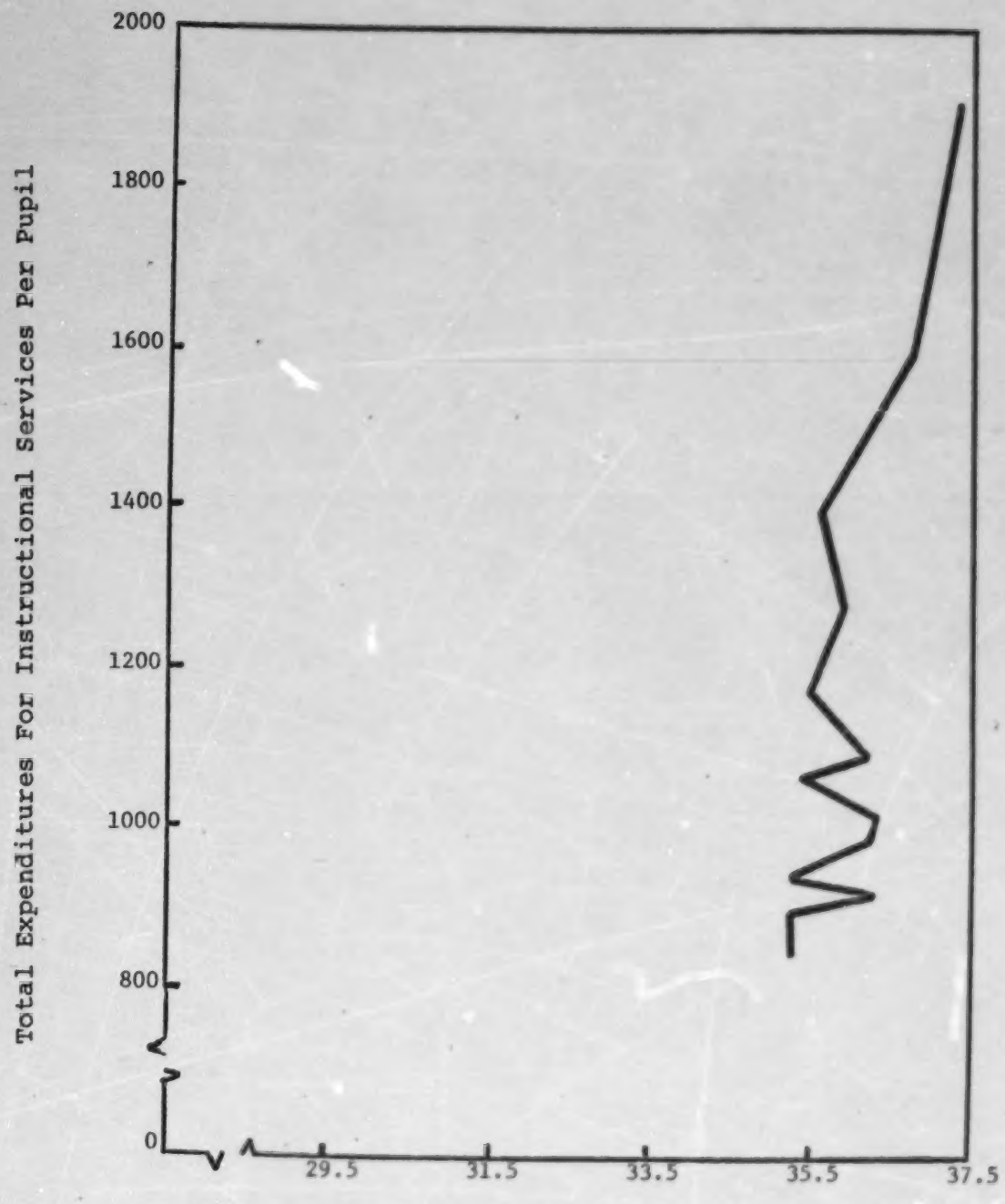
Total Expenditures For Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
29.5
31.5
33.5
35.5
37.5
Median Score on Pupil Evaluation Performance (PEP)
Reading Test - Grade 9

FIGURE 6.28

tures into pupil performance, the results at Grades 6 and 9 indicate pictures of confusion. Some educators have argued that more resources should be allocated to the primary rather than the later grades. An analysis of these results doesn't disprove their contention and could even be interpreted to support it.

Cognitive results can be expressed not only by grade equivalent scores but also by the percentage of pupils who scored below an arbitrary level defined as "the minimum competency level." Figures 6.29 to 6.34 inclusive depict the relationships between expenditures for instructional services and minimum competency levels. As expenditures for instructional services increase, the percentages of pupils scoring below minimum competency levels in mathematics and reading decrease. But the relationships cannot be described in terms of orderly sequenced linear relationships since they are quite convoluted. It's evident that between the lowest and highest expenditure groups that significant differences occur at each grade level with respect to the percentage of children who score below minimum competency levels in reading and mathematics. But the highest expenditure level groups compared to the lowest also tend to differ significantly in socio-economic characteristics, particularly median family income and probably pupil ability. These characteristics could account for these differences other than the flow of expenditures upon pupil performance measures.

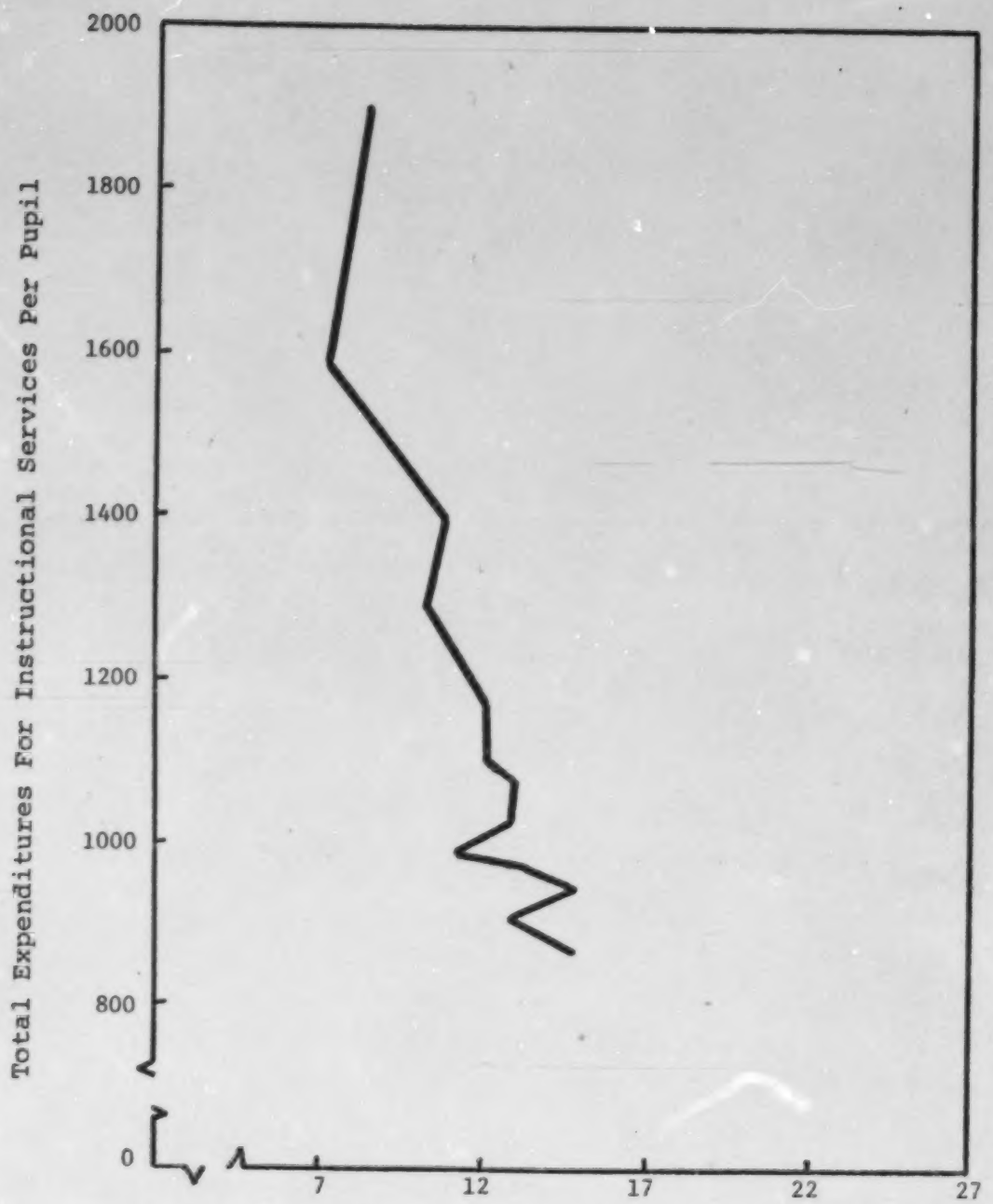
Total Expenditures For Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
7
12
17
22
27
Percent of Pupils Scoring Below Minimum Competency
On Pupil Evaluation Performance (PEP)
Mathematics Test - Grade 3

FIGURE 6.29

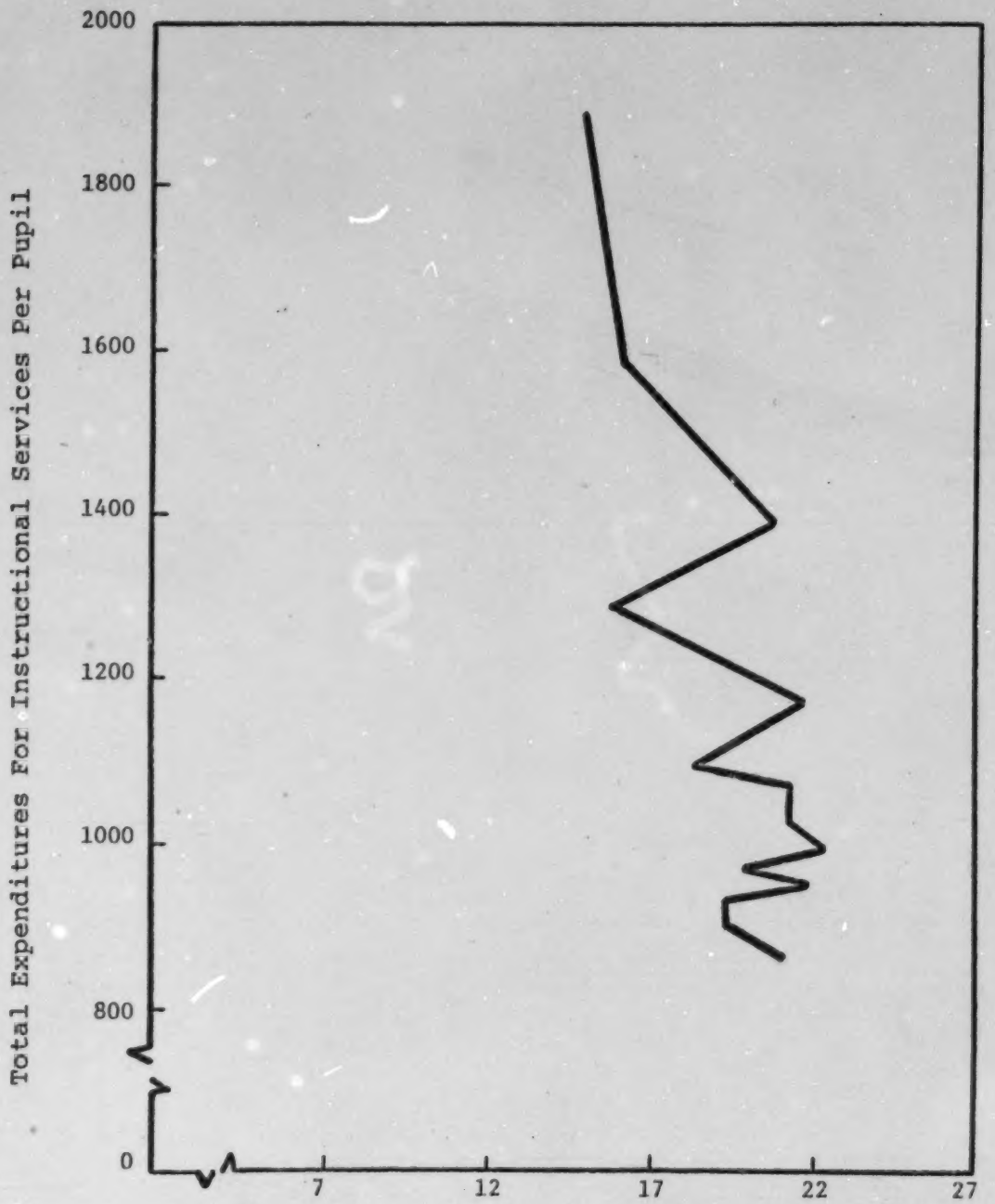
Total Expenditures For Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
7
12
17
22
27
Percent of Pupils Scoring Below Minimum Competency
On Pupil Evaluation Performance (PEP)
Mathematics Test - Grade 6

FIGURE 6.30

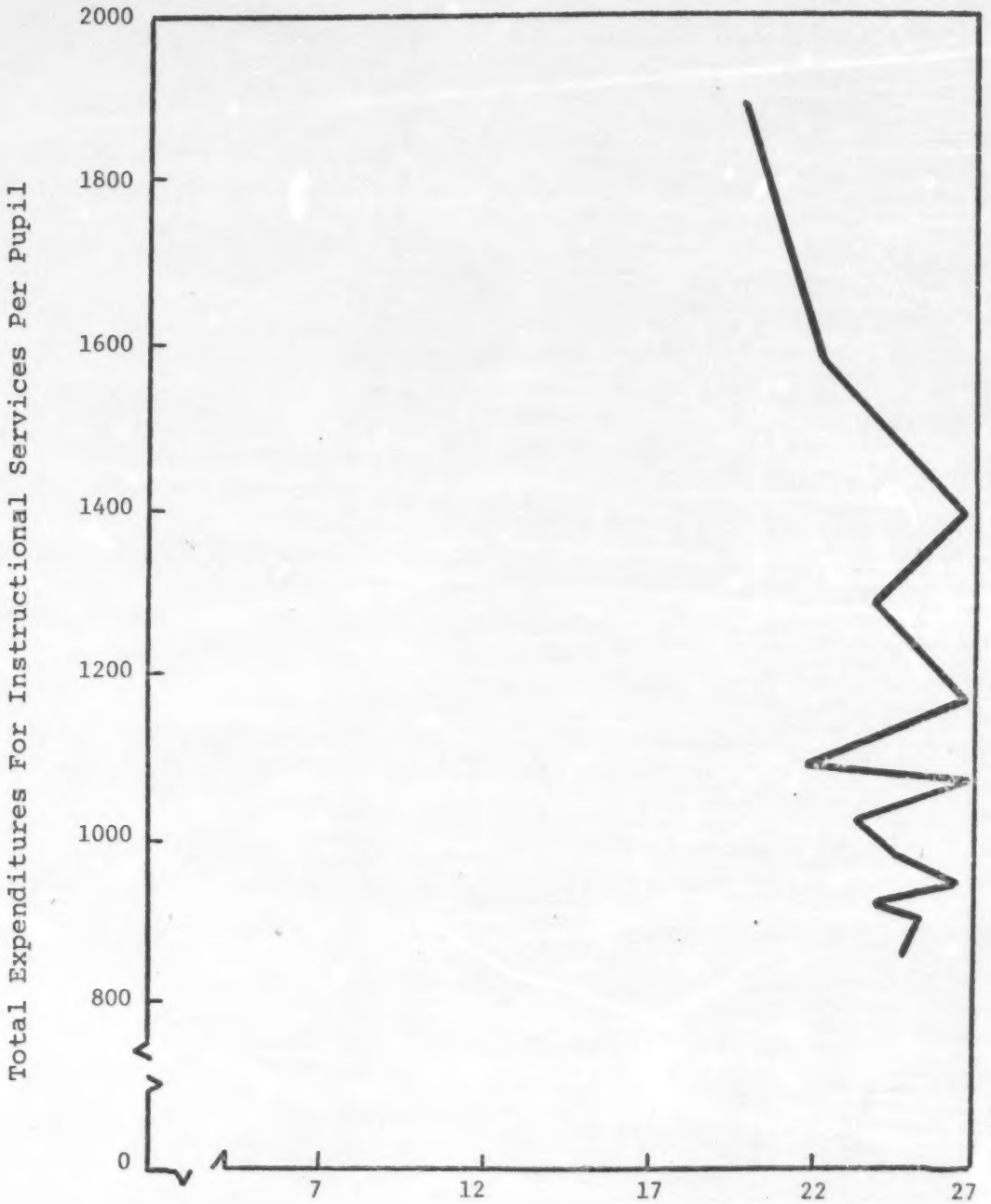
Total Expenditures For Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
7
12
17
22
27
Percent of Pupils Scoring Below Minimum Competency
On Pupil Evaluation Performance (PEP)
Mathematics Test - Grade 9

FIGURE 6.31

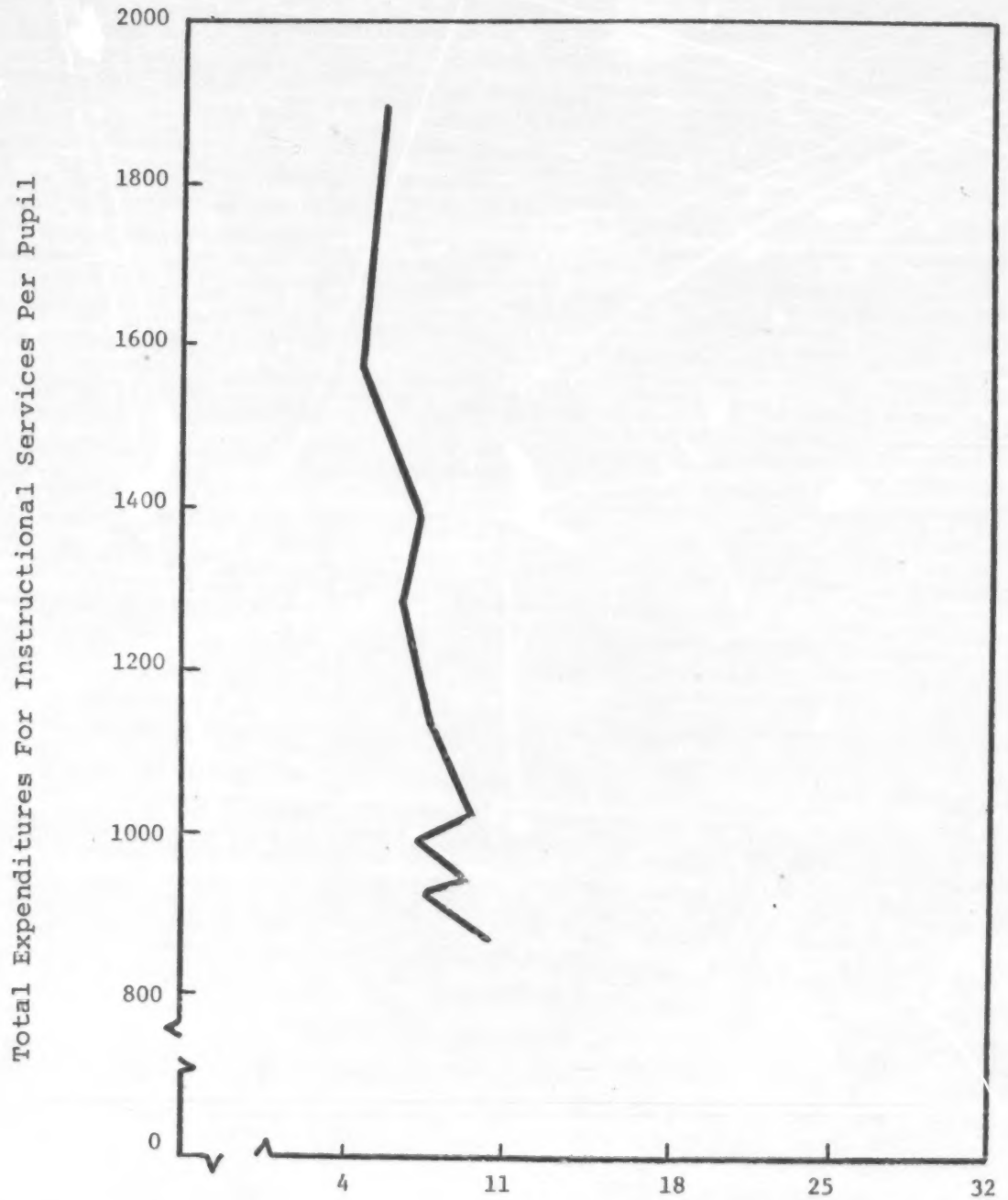
Total Expenditures For Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
4
11
18
25
32
Percent of Pupils Scoring Below Minimum Competency
On Pupil Evaluation Performance (PEP)
Reading Test - Grade 3

FIGURE 6.32

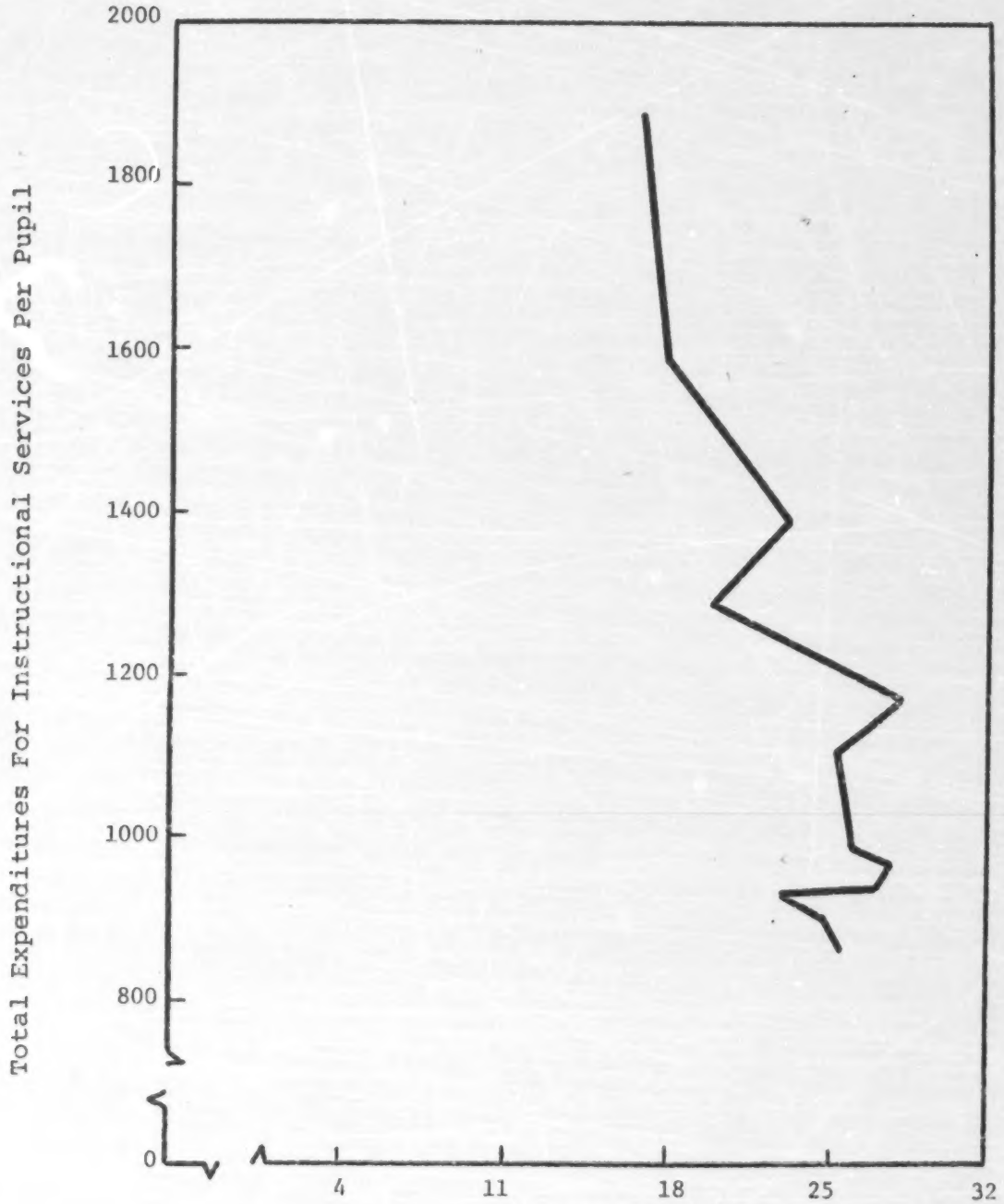
Total Expenditures For Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
4
11
18
25
32
Percent of Pupils Scoring Below Minimum Competency
On Pupil Evaluation Performance (PEP)
Reading Test - Grade 6

FIGURE 6.33

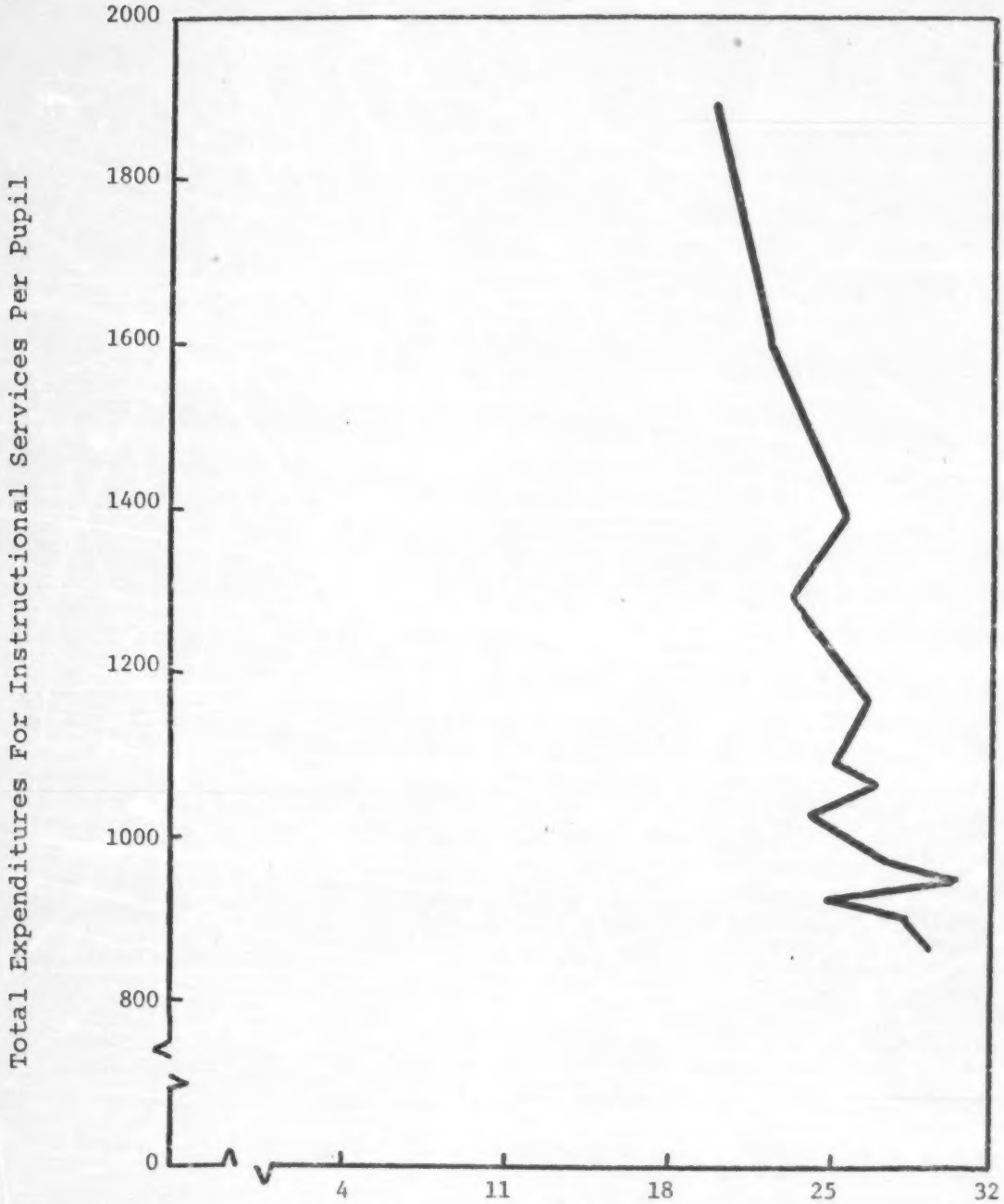
Total Expenditures For Instructional Services Per Pupil
2000
1800
1600
1400
1200
1000
800
0
4
11
18
25
32
Percent of Pupils Scoring Below Minimum Competency
On Pupil Evaluation Performance (PEP)
Reading Test - Grade 9

FIGURE 6.34